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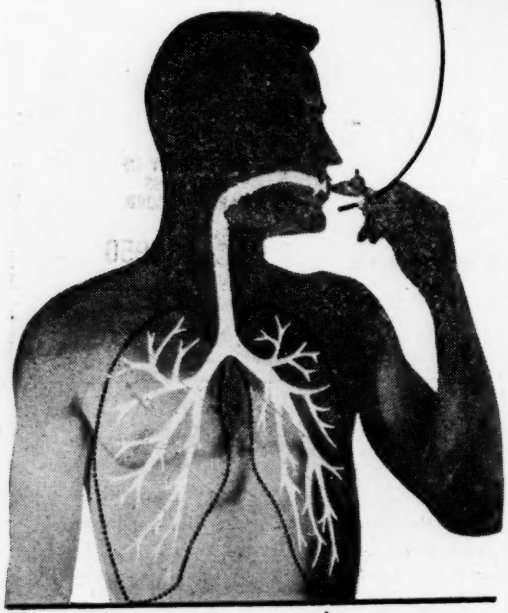

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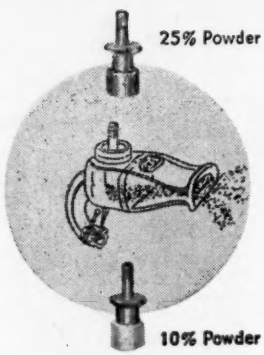

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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ORIGINAL ARTICLES

e Changing Face of Surgery
Sir CECIL WAKELEY, F.R.C.S. 721
e Patient and His Disease
A. E. CLARK-KENNEDY, F.R.C.P. 723
servations on a Prozone Phenomenon Encountered in Using the Anti-globulin Sensitisation Test
J. J. VAN LOGHEM, M.D.
M. KRESNER
R. R. A. COOMBS, M.R.C.V.S.
G. F. ROBERTS, M.D. 729
mma Globulin in the Prevention and Attenuation of Measles 732
rility Due to Congenital Absence of the Vasa
BERNARD SANDLER, M.D. 736
lasia of the Vasa Deferentia as a Cause of Sterility
G. L. FOSS, M.D.
ASHTON MILLER, F.R.C.S. 737
quefaction of Viscous Purulent Exudates by Deoxyribonuclease
J. B. ARMSTRONG, M.D.
J. C. WHITE, M.B. 739
stology of the Endometrium in "Organic Uterine Hæmorrhage"
A. M. SUTHERLAND, M.D. 742

PRELIMINARY COMMUNICATION

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JOHN C. THOMAS, M.R.C.S.
A. T. MENNIE, M.B. 745

SPECIAL ARTICLES

Pattern of Mass Radiography
G. W. HOFFSTAEDT, M.D. 756
uature Radiography with × 5 inch Cut Film
OWEN CLARKE, M.D. 757
tion of Chloramphenicol 759
and the 1951 Festival of
h
RENCE DOPSON 760
al Medical Council 761

IN ENGLAND NOW

Running Commentary by Peripatetic Correspondents 765

LEADING ARTICLES

THE SECOND PREMISE 749
MASS RADIOGRAPHY 750
SURGICAL RELIEF OF ANGINA PECTORIS 751

ANNOTATIONS

Chloramphenicol on Prescription 752
Mechanical Heart and Lungs 752
Tuberculosis and Health Workers 752
Fluid Balance 753
The Doctor and Atomic Warfare 754
Explosions in the Operating-theatre 754
Pay in the Forces 754
An Informative Year 754
The Blair-Bell Medallist 755
"Cities Without Noise" 755
The Durham Dispute 755

LETTERS TO THE EDITOR

Registrars (Dr. Ffrangcon Roberts; Dr. G. R. Venning; Dr. Cecil McIver; Dr. H. Bourne and others) 766
Field Work for Students (Dr. T. H. Howell) 767
Salicylate as an Anticoagulant (Dr. Paul Gibson) 768
Myxœdema from Resorcinol Ointment Applied to Leg Ulcers (Dr. Fr. Klein, Dr. V. Ottis, Dr. J. Velvart) 768
Simple Test for Pregnancy (Dr. M. El Mishad) 768
Tubercle Bacilli in the C.S.F. (Dr. Béla Steiner) 768
Potentiation of Sulphonamides (Dr. R. D. Barnard) 769
Chest Physicians and Tuberculosis (Dr. Thomas Paxon) 769
Deoxycortone and Ascorbic Acid (Dr. Selvan Davison; Dr. Hosny Ayad; Dr. L. L. Terry, Dr. Frank London; Dr. D. L. Davies, Dr. A. Harris, Dr. F. Post; Dr. J. O'D. Alexander, Dr. Thomas Cochrane) 770
Florence Nightingale (Dr. W. F. Annand) 772
St. Paul's Cray Appointments (Miss P. Hornsby-Smith, M.P.) 772
Royal Medical Benevolent Fund (Dr. C. L. Batteson) 772
Oral Streptomycin in Gastro-enteritis (Dr. W. Diwany, Dr. Z. A. Abdin) 772
Trophic and Tropic (Prof. J. H. Burn, M.D., F.R.S.) 773
Revolt at Kingston (Dr. T. W. Morgan) 773
Chemical Properties of P.A.S. (Mr. Z. Horn, Mr. S. Bogsch, CHEM.A.) 773
Pethidine and Thiopentone (Mr. F. H. Summers, M.P.S.) 774
Consciousness with Ventricular Fibrillation (Dr. Jean Vinter) 774
Enuresis and Hypersomnia (Dr. Emilio de la Peña) 774
Scorpion Stings (Dr. P. A. Christensen, Miss Margaret Widdicombe, B.SC.) 774
Study of Delinquency (Dr. H. Edelston) 774

REVIEWS OF BOOKS

The Breast 747
Nutritional Improvement of Life 747
Physiology of Tissues and Organs 747
Analytical Psycho-therapy 747
Industrial Health 747
Social Medicine 748
Die Gewebsmastzellen im menschlichen Knochenmark 748
Personality in Peptic Ulcer 748
Some Applications of Nuclear Physics in Medicine 748

DISABILITIES

55. Fracture of the Spine 763

PUBLIC HEALTH

Poliomyelitis 764
Smallpox not Confirmed 764
Infectious Diseases 764

PARLIAMENT

Voluntary Euthanasia 775
Question Time 775

OBITUARY

Sir William Thomson 776
Alexander Low 777

NOTES AND NEWS

Hazards of Fluid Therapy 778

INDEX OF NEW PRODUCTS

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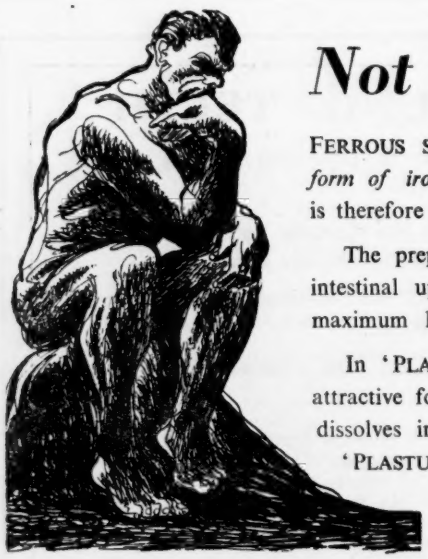

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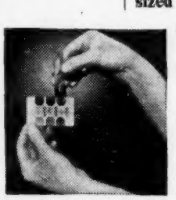

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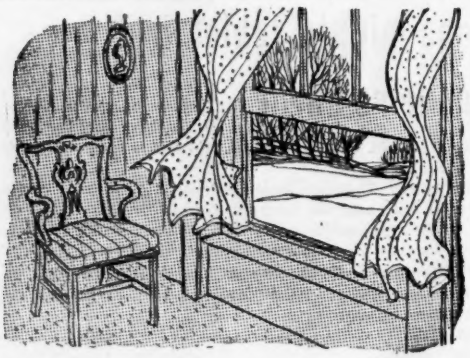

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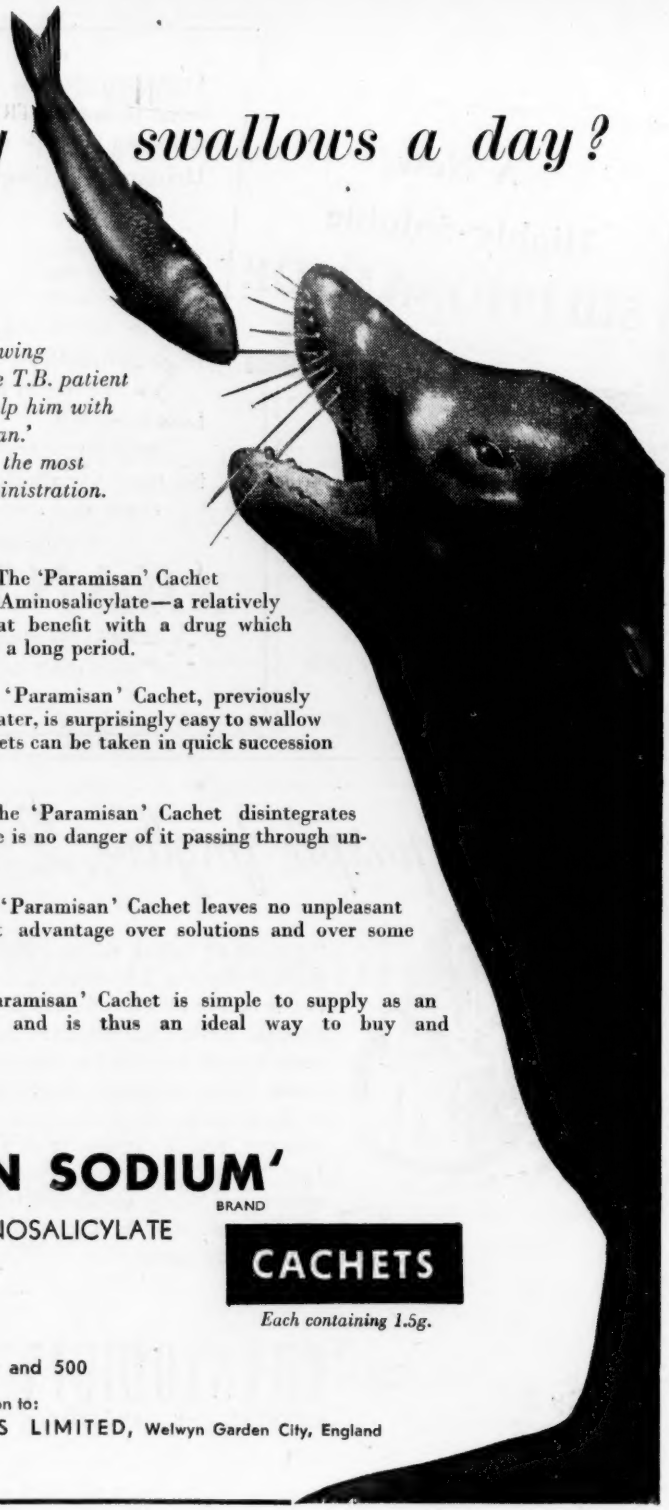

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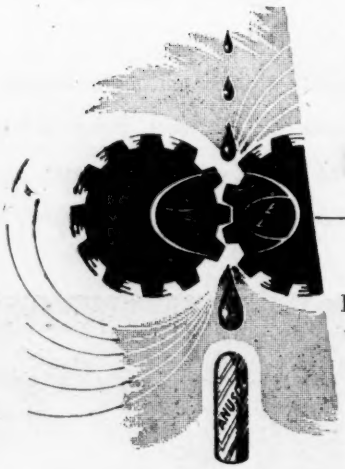

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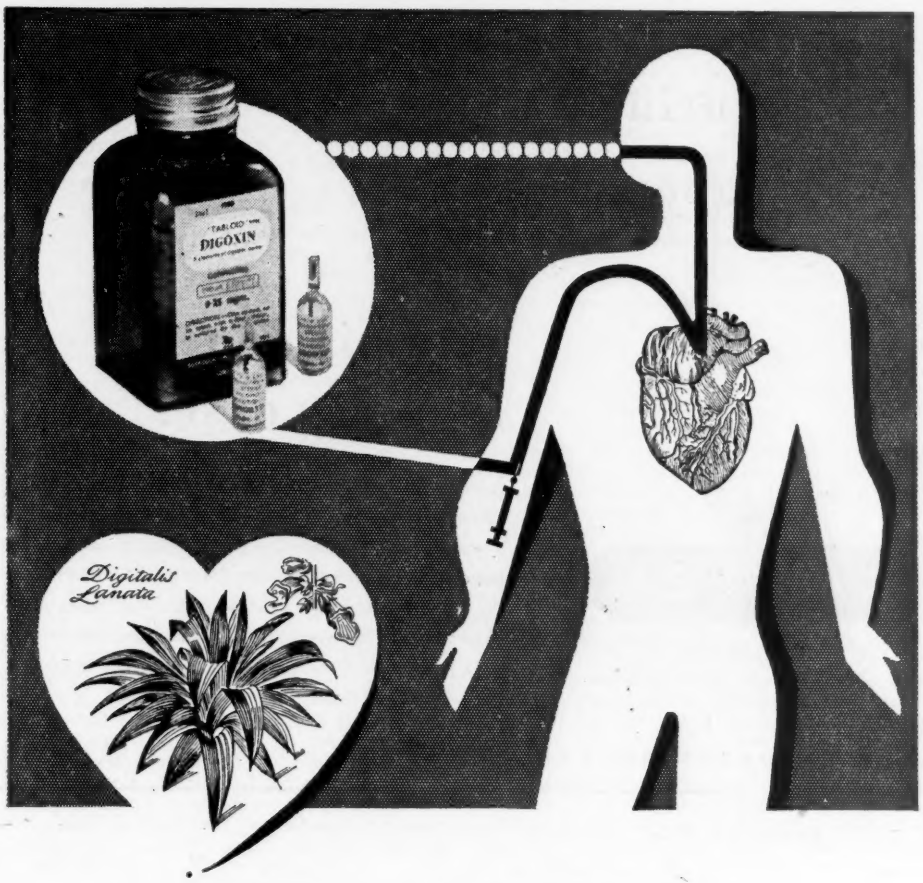

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THE CHANGING FACE OF SURGERY*

SIR CECIL WAKELEY
K.B.E., C.B., D.Sc., P.R.C.S.

SENIOR SURGEON AND DIRECTOR OF SURGICAL STUDIES, KING'S COLLEGE HOSPITAL, LONDON; SURGEON TO THE ROYAL MASONIC HOSPITAL AND THE BELGRAVE HOSPITAL FOR CHILDREN; CONSULTING SURGEON TO THE WEST END HOSPITAL FOR NERVOUS DISEASES AND TO THE ROYAL NAVY

SURGERY as we know it may perhaps be termed a new profession, when compared with the profession of medicine by physicians. In the days of the ancients, operations of various kinds were performed, but in the early hundreds A.D., barbers, bathkeepers, mountebanks, and sow-gelders were the people to whom the practice of surgery was entrusted. In their hands the art fell to a low level. In A.D. 529 St. Benedict founded at Monte Cassino a monastery which became famous once again in the second world war. Here a rebirth of surgery took place. But in A.D. 1210 William of Salicet wrote: "A wise surgeon will refrain from stealing while he is actually in attendance on a patient." Even as late as this the profession of surgery could hardly be called a noble one.

Although in 1295 Lanfranc held that "no man could be a good physician who has not acquired a knowledge of operative surgery, a knowledge of both branches is essential," surgery was retarded by prejudice and tradition. Even such men as Galen remarked: "Surgery is only a mode of treatment." It was Pope Innocent III who said: "Ecclesia abhorrit a sanguine."

In A.D. 1368, by the appointment of master surgeons, a small guild of surgeons within the City of London was officially recognised. This was the earliest recognition of surgeons becoming distinct from both barbers and barbers exercising the faculty of surgery. The first Act regulating the practice of surgery in England was passed in A.D. 1441, but the struggle between the barbers and the surgeons went on until 1540 when the two guilds became incorporated as the Barber Surgeons.

There were really three factors which held back the progress of surgery.

One was the knowledge of anatomy or the lack of it. The student of today may well be appalled at the amount of anatomy which he is expected to learn, but the practice of surgery nowadays is dependent upon a detailed knowledge of anatomy. For many years any effort to obtain bodies for dissection was frowned upon by the Church, and as late as the 18th century it was only by illegal means that even the bodies of criminals were obtained for examination.

The second was the incidence of sepsis, which was always a sequel to surgical intervention, death very often following even minor procedures, until the researches of Lister resulted in antiseptic surgery, which has now been modified to aseptic surgery.

The third factor was the lack of adequate anæsthesia.

Until Lister with antiseptics and Simpson with anæsthesia removed the two last obstacles, the operations by which reputations of great surgeons were made, were more or less confined to amputations and cutting for stone. Both these operations were performed with great rapidity, surgeons disarticulating at the hip-joint in under a minute and removing a stone from the bladder by lateral lithotomy in under thirty seconds.

In the latter half of the last century what we now understand by the art of surgery took shape. Surgeons were able to open the abdomen. As time went on and anæsthetics developed, the brain was explored, the chest opened, and the scope of operations increased.

With the widening field of surgery there has been associated a more detailed study of the basic subjects of anatomy, physiology, and pathology, and in the last thirty years surgery has undergone changes which are related to discoveries and developments in the ancillary subjects. The discovery of the sulphonamides in 1931 was followed by the discovery and clinical use of penicillin, and later of streptomycin and the other antibiotics now under clinical trial.

The physicists have developed X rays and radium, and radioactive elements are being used in the investigation and treatment of patients. The biochemists have played their part too. Intravenous therapy with blood, plasma, serum, saline, and glucose-saline is of ever-increasing importance in extending the ever-growing scope of surgery. The importance of water balance in the body has now been recognised.

In this country anæsthesia has established itself as a full specialty, and has been improved to such an extent that surgery which could not be practised twenty years ago is now performed as an everyday procedure. The old arrow poison, curare, which was used by primitive people to kill their enemies, is now used by anæsthetists with better motives.

With the increasing average age of the population and the greater longevity of the race, with the help of better anæsthetics, better supportive treatment, and the use of antibiotics, more old people are now undergoing major operations and surviving without becoming a burden to the rest of the population.

UNDERGRADUATE TEACHING

Before the days of Lister surgical lectures were practically the only form of instruction for the students. Today set surgical lectures are not popular nor are they necessary. In their place lecture-demonstrations have come into vogue. Bedside teaching and outpatient teaching are of the utmost service to the student. It is only by coming into personal contact with patients that students can acquire a satisfactory knowledge of surgical conditions. The actual palpation of a lump or tumour will register far more on the cerebral cortex of the student than a well-delivered lecture.

APPRENTICESHIP

In earlier days the student was apprenticed to a surgeon, and there was a great deal to be said for this form of learning. There was a personal touch about this way of acquiring clinical knowledge and the added interest of seeing patients in their homes and thus becoming initiated into problems which nowadays are only met with after qualification. It is to be hoped that when the new Medical Act comes into force, making a year's postgraduate experience compulsory prior to registration, the qualified student will be able to take part of his year's postgraduate training with a general practitioner.

Apprenticeship puts the student on his mettle because he must rely on his clinical acumen rather than on all the ancillary aids which are ready at hand in hospitals. There is a tendency today to overlook clinical observation and to rely too much on X rays and pathological or biochemical tests in making a diagnosis. I very much doubt if the clinician today has the clinical acumen of the late Victorian physicians, who made their diagnoses without the aid of tests and were often amazingly accurate.

PROFESSORIAL UNITS

After the first world war the surgical professorial units came into being, and their number has been greatly increased since the second world war. There is a trend, however, for full-time professorial units to become too academic and to lose touch with patients and their diseases. There seems to be a tendency for teaching

* Opening address delivered at the Westminster Hospital Medical School on Oct. 2.

and attention to be directed to those whose sole object is to pick out a small aspect of surgery and beat it until it is dead, and to take teaching away from those who are practising surgery as a full-time occupation, the very people who are continually in touch with patients and their diseases, and who are therefore perhaps the better able to teach because their knowledge is more practical and less academic.

Whole-time surgical professors are apt to spend the greater part of their day attending university meetings, and therefore they have less opportunity for actual teaching and operating than their part-time colleagues.

Part-time professors of surgery have in the past century been pioneers, for it is from them that advance in the art and practice of surgery has sprung. Such men as Lister, Fergusson, Macewen, Stiles, and Watson-Cheyne all held professorial surgical chairs, but they gave only half their time to these appointments. They came into contact with the practitioner, did consultative practice, and were in constant contact with their professional colleagues. To my mind any real advance in surgery will come from the part-time men rather than the whole-time surgical professor.

SPECIALISATION

Specialisation in surgery is good up to a point, but there is a real danger of developing the ultra-specialist who will only perform one type of operation. Such a state of affairs is bad for teaching and makes for little progress. There is a tendency to view a patient with ultra-specialist eyes and only see a minute part of the anatomy instead of considering the patient as a whole. How often has a special operative procedure been performed on a patient in whom a far more serious condition has been overlooked because a careful general examination has not been carried out.

It is important that surgeons on the staff of teaching hospitals should remain general surgeons, but it does not matter if they have a hobby—for instance gastric surgery, thyroid surgery, or urological surgery. General surgeons should have a sufficient variety of cases to give the students a general outlook which is essential. It is, I think, agreed that there should be in teaching hospitals 5 beds per clinical student in general medicine and general surgery, but I wonder how often this obtains today.

WAR AND SURGERY

There has always been a relationship between war and surgery. Many of the famous surgeons of older times were military surgeons before they became well known in civil life.

Progress in surgery occurs during great wars because the surgeon has such a wealth of material coming under observation and review. The lessons learned in wars are often of great value in civilian practice; this is especially so with regard to traumatic lesions. In this mechanical age the treatment of injuries to the body is of the utmost importance. During wars surgical knowledge is pooled and made available to vast numbers of surgeons. This was especially noticeable in the second world war when the War Wounds Committee of the Medical Research Council did a great service to the medical personnel of the fighting forces of Great Britain and America. The use of blood-transfusion, of penicillin, and of early evacuation by air were developments which will not be easily forgotten by medical men in the Services. Every branch of surgery made progress during the last war, but perhaps the most outstanding advances were made in the treatment of nerve injury and the surgery of the heart and great blood-vessels.

EARLY AMBULATION

Today the patient is no longer allowed to become an invalid because he or she has had an operation. Early ambulation has proved its worth both in the young and old and has lowered considerably the incidence of post-operative thrombosis and embolism. At the commencement of the present century elderly patients suffering from fracture of the femoral neck did not die from the injury but from pneumonia due to enforced rest in bed. Today early operation, early ambulation, and the use of penicillin have removed most major complications.

Early ambulation has put a different complexion on the bad-risk patient, for he benefits not only physically but also mentally. The stimulating effect of early ambulation on an obese female patient following cholecystectomy has to be seen to be believed. There is less likelihood of pulmonary collapse, inertia of the abdominal muscles, and circulatory failure, and there is in addition the desire to get well quickly. The old-fashioned procedure of 14 days in bed after an operation simply led to atrophy of the muscles, and distension of the intestines, with constipation and depression as a result.

Modern physiotherapy goes hand in glove with early ambulation. Before operation the patient is taught how to breathe properly and how to make use of the abdominal muscles. This preoperative preparation has a very definite beneficial effect on the patient who will co-operate after the operation and use his abdominal musculature and so reduce the incidence of complications.

THE PUBLIC AND THE PRESS

Before leaving the subject of postoperative after-treatment it might be well to consider how much a patient should know.

Although the public require to be educated in certain aspects of disease—especially in cancer—yet we must always remember that there is a danger of the press and the public knowing too much. Moderation in all things should be the ideal. Instruction in the early signs of cancer may be justifiable and important, but it would be a tragedy if we were responsible for creating a national cancer phobia among the population.

When the mystery goes out of surgery the patient often loses much of his coöperative power and confidence in his full recovery. Human beings are individuals and require treating as such. Some will benefit from a description of the operation performed upon them, while such knowledge will transform others into nervous wrecks; the surgeon must decide how much knowledge is justified in each individual case.

Confidence is the sheet anchor as far as the patient is concerned; once confidence is established he will cease to worry and the surgeon will have little difficulty in getting coöperation throughout any form of treatment that may be necessary.

SURGERY OF THE FUTURE

To those starting on a surgical career it may seem that operations go according to plan. Extensive operative procedures are seen to cause a minimum of inconvenience to the patients, owing to blood-transfusion, gastric suction, and the preoperative and postoperative use of vitamins and drugs such as vitamin K and heparin; yet you must remember that these are recent innovations in surgical treatment and rarely a year passes without the introduction of something new. Surgery has by no means arrived at its zenith and further progress is not yet impossible—although it may well be that future research will eliminate some forms of surgical operations and that some diseases now treated surgically will be cured by intravenous drugs or other forms of treatment.

Surgeons of the Westminster Hospital have played an important part in the world of surgery and have contributed their quota to the changing face of the profession of surgery. To mention only a few, Walter Spencer, Rock Carling, Tudor Edwards, and Stanford Cade are men of whom you should all be proud.

THE PATIENT AND HIS DISEASE *

A. E. CLARK-KENNEDY
M.D. Camb., F.R.C.P.
PHYSICIAN TO THE LONDON HOSPITAL AND DEAN OF THE MEDICAL SCHOOL; FELLOW OF CORPUS CHRISTI COLLEGE, CAMBRIDGE

IN my first lecture I pointed out that the human body is the product of the plan laid at its conception and the environment in which it develops and is subsequently maintained. I said that the brain permits the development of consciousness; and that consciousness permits the development of mind, which evolves under the stimulus of experience, the brain conditioning the process. From that conception, I went on to review the risks to which human beings are exposed. Faults in the genetic plan may interfere with the development of the body and through the brain with the evolution of the mind. Adverse factors in environment may act on, and stimulate reactions by, the body, leading to pathological processes of the body which may interfere with its structure and functions, and if the brain is involved, with the structure and functions of the mind. Adverse factors in environment may also affect the mind directly through the organs of special sense and the understanding, leading to pathological processes of the mind. But it is an assumption to suppose that the human mind will ever be explained entirely in terms of the structure of the brain and the experience through which an individual passes. All men feel free to run their bodies into danger or deliberately protect them from risk.

Pathology of Body and Mind

Primary pathological processes of the body, if they affect the brain or any function of the body on which the brain depends, lead to abnormal reactions of the mind. They can weaken the power of the will, alter behaviour, cause confusion of appreciation of events in space and time, and modify emotional feeling. Primary pathological processes of the mind (which cannot exist apart from the body) may have a profound effect on the body. In conversion hysteria subconscious wish-fulfilment interferes with physical function through the skeletomotor nervous system. In anxiety states repressed emotion interferes with physical function through the autonomic nervous system. Thus far, disease might be comprehensible in terms of Cartesian or Platonic dualism. A rider can normally control his horse; but a bad horse can gain control of its rider, and a bad rider can upset a perfect horse.

Many clinical conditions, however, are not to be explained so simply. They cannot be attributed to any known pathological process of the body interfering with the structure and functions of the brain on which the mind is based. Nor can they be attributed to any pathological process of the mind interfering with the structure and functions of the body. They cannot in fact be explained in terms of a simple dualistic hypothesis of body and mind. Both body and mind seem at fault or in some way peculiarly related. Take, for example, the functional psychoses to which I have already referred. We are all liable to be depressed by unhappy circumstances, and physical disease modifies our emotional reactions to some extent; but in some people attacks of depression of mind associated with depression of physical health (which defies exact analysis) may occur again and again for no apparent reason and sometimes alternate with phases of excitement. It is true that disorder of mind dominates the scene, but these attacks exhibit in many respects the features of physical disease. Moreover, a family history of mental instability and an association with certain physical types both point, as I said, to a genetic peculiarity in the structure of the brain which, we must suppose, has so conditioned the development of the mind (to separate body and mind artificially in order to try to arrive at some concept which our own minds can grasp) that it is peculiarly liable to react emotionally to ordinary experience; while at the same time the development of the mind in this way has so conditioned the subsequent maintenance of the body that the mind is peculiarly liable to succumb through the body to physical disease. In other words, we must invoke the psychosomatic concept of body and mind developing together, each reacting on, and reacting back on, the other; a view borne out by the tendency of cases of this kind to progressive mental deterioration suggesting further changes in the underlying brain as experience of life increases. Do we not see the same kind of thing in epilepsy?—the genetic tendency to fits, and then the progressive deterioration of the mind under the stress of mental and physical experience.

Similarly, every normal person tends to suffer to some extent from physical symptoms due to sympathetic stimulation when emotionally upset, and many are also liable to headaches or attacks of migraine or giddiness under similar circumstances. But these changes are transitory and leave no structural consequences behind. Some people, on the other hand, seem to be so constituted that emotional disturbance may precipitate thyrotoxicosis, leading to rapid loss of weight, or so sensitise their bronchioles to peripheral stimulation that they start to suffer from asthma which may lead to heart-failure eventually. In others, emotional states are associated with increased irritability of the skin, predisposing to structural change, while the association of characteristic emotional mental states with simple ulceration of the stomach and duodenum and ulcerative colitis is probably significant. We are driven to conclude, I think, that in these patients (in so far as our own minds can visualise psychosomatic development) the body has so conditioned the development of the mind, and the development of the mind has so conditioned the subsequent growth and maintenance of the body, that they are particularly liable to succumb physically to adverse physical factors or to emotional stimulation. Structural changes now supervene which are not produced in more normal people unless physical factors act more strongly—thyrotoxicosis in acute infection, for example, and true allergic asthma. Clinical experience, therefore, leads us to abandon our dualistic view of the body-mind relationship, and compels us to conclude, as I have said already, that body and mind are different aspects of one underlying reality which, like energy and matter, form and substance, we cannot directly apprehend, our minds being so constituted that to us body and mind, like energy and matter, inevitably appear distinct.

Further, does the mind play no part in the pathogenesis of diseases associated with typical structural changes which are generally regarded as of an organic nature, although we do not yet understand their causation? For instance, is it possible for an unwanted pregnancy to precipitate disseminated sclerosis or for a sudden shock to lead to cardiac infarction? Can a man die of a broken heart or be killed by business worries? Could the news of Austerlitz have killed Pitt? Again the association between emotional shock and organic disease seems too common sometimes to be attributed merely to chance, and there is certainly no theoretical reason why operations of the mind should not predispose the body to succumb to adverse physical factors in environment or even lead to structural change in it direct. The transmission of impulses across synaptic junctions and the action of nerves at their endings are both due to the

* The second Croonian lecture for 1950, delivered before the Royal College of Physicians of London on May 11. The first was published on Dec. 2.

formation of chemical substances; and, the body being a chemical structure, chemical change, even to this extent, is fundamentally structural change. Moreover, emotional and mental stress are both known to influence endocrine secretion, and endocrine secretion has a profound effect on structure and function. Besides, if shock can turn a man's hair grey, why should it not lead to degenerative changes in his coronary arteries? But we must not expect regularity. No two people have the same constitution, and constitution is basically physico-chemical. One man's body, it seems, is like a house built on the sand. He is predisposed to succumb physically to mental stress if subjected to it on a sufficient scale. Another man appears to be made of stronger stuff. The rain descends, and the floods come, and the wind blows. But his house falls not. It is founded on a rock.

The Nature of Disease

There is no absolute dividing line between health and disease. Normality is only that which is most common. Constitutional strength merges into average health, and average health through constitutional weakness into disease, the body being, as I have already pointed out, a balanced self-regulating machine permitting consciousness, dominated by mind, and capable of adaptation to a greater or lesser extent to demand on function from within and change in environment without. But there are limits to this process of adaptation. Disease, as I see it, is that condition of a person in which action on his body, direct or through his mind (which can influence to some extent the structure and function of the body), or action on his mind, direct or through his brain (which conditions the development and reactions of the mind), stimulates reactions by his body and/or mind; and then these together lead to alteration of structure or disturbance of function with the result that eventually he starts to complain of symptoms or discovers signs in his body, or his friends notice an alteration in his appearance or complain of some change in his behaviour. Nevertheless, even a definition of this length is far from "watertight," and I doubt that any definition could be framed which would satisfy everybody. In brief, if you prefer it, disease is that condition of a man in which genetic faults, on adverse factors in environment, or both together, are interfering with the normal balance of the machinery of his body and/or mind on which his adaptation to environment depends.

Ill health can therefore be understood to some extent, and usually understood sufficiently for practical purposes, in terms of its causes, which we can sometimes discover, and in terms of alteration of structure and disturbance of function, which we can often observe. In some conditions, however, it is necessary to think in terms of the unseen chemical machinery which underlies all forms of structure and function, and for a more profound understanding of disease a synthesis of structural, functional, and chemical concepts is necessary, in the same way that a synthesis along similar lines is required for understanding the nature of man himself. But it is doubtful if we can ever hope to understand disease completely even in chemical terms. There can be no disease without a patient to suffer from it, in the same way that there can be no mind as ordinarily understood without a body to maintain it. Every disease, we must admit, is an integral part of a man, the product of heredity and environment, in the same way that the man himself is the product of his heredity and his environment. Diseases divorced from patients are abstractions from reality, the descriptions in the textbooks being compound pictures of a large number of similar observed reactions. We do not understand the nature of a man, particularly the relationship which exists between his mind and his body. Whence it follows that we cannot really understand the nature of his disease which is so essentially a part of him. Therefore, although medicine must use science freely, it cannot ever be wholly scientific, as some would make it if they could. It must always remain to a large extent empirical, compelled again and again to deal in a practical way with much which we do not understand. Many would say that for this reason it must always to a large extent remain an art.

Man has changed little down the ages. It is his diseases which have altered with the passage of time, owing to variation in the micro-organisms pathogenic to him, and the use which he has made of his mind to increase his knowledge and modify his environment. Clearly diseases cannot be ready-made entities which overtake us and which can be neatly classified and labelled as their Latin names suggest. Rather, a little thought reveals that they must be reactions (outside the average which determine our ideas of normality) between a man's genetic origin (no two men have quite the same genetic origin) and his environment (no two men have quite the same experience). They also depend on the use which the individual makes of his mind, and at this level adverse physical factors may not act adversely. (It is exceedingly doubtful if any man would flourish long in his particular Utopia.) But there are no absolute dividing lines in this three-dimensional continuum. Excessive demand on normal function merges imperceptibly into constitutional disease, due to normal demand on function of a body or mind weak for little understood genetic or environmental reasons. Constitutional disease merges imperceptibly in one direction into psychoneurotic disease due to adverse factors in environment interfering with the development of a mind based on a brain somatically weak, and in the other into organic disease due to adverse factors in environment interfering with the development or maintenance of a body somatically weak for genetic reasons. Psychoneurotic disease and organic disease merge imperceptibly into psychosomatic disease in which the constitution of the patient is such that his body is predisposed to succumb to emotional stress or his mind to physical ill health. Psychosomatic disease, as thus defined, merges into organic disease in which little understood genetic or acquired factors conspire to produce structural and functional abnormality. Organic disease of this type merges into organic disease due to definite genetic defects or isolated adverse factors encountered by mischance in man's environment, or more often to some combination of genetic and environmental causes. This conception may well be wide of the mark. Nevertheless, it must be nearer the truth, I maintain, than the conception of diseases as distinct and isolated entities, necessary though that simplification must often be for practical purposes and for exchanging experience with one another.

Certain diseases, however, stand out as fixed points in this continuum, like the main peaks in a mountain range. These are the peculiarly characteristic reactions between man and his environment which we meet in practice occasionally, and the more common reactions which we encounter almost every day, although it must be remembered that no two cases of what we call the same disease are ever really quite identical, because they are the reactions of two individuals constituted differently to a cause which is probably operating slightly differently in both cases. In some, such as diabetes and endogenous depression, a particular disorder of function dominates the scene and gives a disease its name, structural changes being absent almost altogether; in others, such as carcinoma and the reticuloses, there is a characteristic alteration of structure, the functional disturbance produced not being particularly characteristic. In a third type, characteristic structural change and typical

functional disturbance are both in evidence, as in rheumatic heart disease and hypertensive failure. Thus many diseases, within the sense defined, can be recognised at sight, and appear to " breed " true to type like birds and beasts and flowers.

Diagnosis

Sometimes, therefore, diagnosis is empirical, based on observation and experience, the pathological process and disorder of function from which a patient is suffering being obvious at sight. Under these circumstances no conscious processes of thought are necessary; and, as experience increases, clinical pictures as a whole can often be recognised without thinking, entirely from experience. At other times diagnosis is rational, based on reason, on the application of systematised knowledge and the accumulated experience of disease of different types to the clinical picture presented by the patient. More often it is partly rational and partly empirical. It depends on a combination of reason and experience.

Every patient who comes complaining of symptoms must be suffering from some alteration of structure or disorder of function of his body or some disturbance of his mind. In one case it may be due to constitutional weakness but might equally well herald the beginning of organic disease. In another a primary pathological process of his body may be interfering with the working of his normal mind or a psychoneurotic reaction of his mind interfering with the working of his normal body. Clearly therefore the casual division of patients into organic and " functional " in hospital practice, where it is mainly a question of spotting the former and disclaiming responsibility for the latter, will not stand analysis; and it will not even work in general practice where these so called " functional " cases take up most of every doctor's time. Under these circumstances diagnosis must be much more accurate than that, and consists so often, not in finding a label which will fit a patient into the book, but in forming a concept, one to which it is often hard to give a name, which must be carried in the mind. Every sick man, I maintain, must be fitted for a practical purpose into his approximate place in our minds in the continuum of human disease which I have endeavoured to describe. Therefore, some method of thinking is essential, and in a difficult case, so often the one in which the patient tends to dismiss his symptoms as unimportant, disorder of function and pathological process should be deliberately divorced. What alteration of structure or disturbance of function is responsible for these symptoms and these signs (if any can be found to help)? What is the underlying pathological process responsible for their production in this particular person?

Some symptoms are clearly of a mental nature. The patient complains of anxiety, depression, or inability to concentrate. Others are subjective bodily feelings. He complains of exaggeration or diminution of a sensation to which he is normally accustomed, or of a new and arresting sensation which he may never have experienced previously. A third group of symptoms includes irregularities of normal function. A fourth comprises structural changes which the patient has discovered for himself. Symptoms of this kind are self-discovered signs which can be confirmed on examination, when further signs are often found. (The only true symptoms are subjective sensations which have no counterpart as signs, and the only true signs objective changes in the body which a man cannot well discover for himself, a distinction without any particular significance.) But, as we all know, the interpretation of a symptom or sign in one patient may be entirely different from its interpretation in another; and the same symptom or sign may suggest failure of function in one patient and overaction of function in another. In most cases, however, the interpretation of symptoms and signs in one direction makes better sense than their interpretation in any other, and suggests that the patient is suffering from failure or overaction of this or that function or that the structure of his body has become altered in this or that manner. Moreover, if they are interpreted correctly it is usually possible to decide which are manifestations of some alteration of structure or disturbance of function due to the direct consequences of adverse action on his body, and which are alterations of structure and disturbances of function due to reactions by his body tending to conserve his life and promote his recovery. When their interpretation fails to make anatomical or physiological sense, signs and symptoms must be a product of the mind.

The nature of the underlying pathological processes, unless the history supplies the clue—social circumstances, for instance; a recent injury; a dangerous occupation; or exposure to infection—is often more difficult to ascertain. (On the whole we know more about disturbances of function than about pathological processes.) Moreover, the same disorder of function may be due to many different pathological processes with the result that accurate diagnosis of the functional disturbances in a patient does not necessarily help in the diagnosis of their underlying cause. Nevertheless, certain guiding principles stand out, and, in order to complete the picture which I am endeavouring to paint, let me state them briefly.

Symptoms which a patient refers to his mind can originate in mind or body, but, amnesia excepted, are seldom deliberately invented. (Physical symptoms serve the malingerer better.) Anxiety, inability to concentrate, and mental fatigue are usually psychoneurotic; severe emotional disorders psychotic. Confusion and intellectual impairment are usually organic; delusions and hallucinations, when consciousness is clear, psychotic.

Symptoms which a patient refers to his body can also originate either in his body or in his mind. Fantastic symptoms—fantastic in the sense that they cannot be explained in terms of any known disturbance of function —must be invented by the mind; even pain must be hysterical when it lacks the features of true pain, and is probably hysterical, in part at least, if it is clearly serving the patient's purpose. Possible symptoms—that is to say, symptoms capable of functional interpretation—when unrelated to demand on function are probably psychogenic; if of the visceral variety, due to anxiety stimulating overaction of the sympathetic; if of the somatic variety, due to the mind intervening subconsciously in the affairs of the body through the skeletomotor nervous system. Physical symptoms related to functional demand which have remained unchanged for long periods, or supervened only with increased demand on function, are probably due to excessive demand on function weak for genetic or acquired reasons. As we all know, it is the new symptom related to normal demand on function, in a patient who has never had any weakness in that direction previously, which suggests organic disease.

But from time to time organic disease starts in the neurotic person, and then the interpretation of symptoms is particularly liable to go astray unless physical signs are discovered to keep the diagnosis straight. For the absence of physical signs does not exclude organic disease, or their presence necessarily indicate that it exists. All signs are not of equal significance. Some can be due to excessive demand on normal function or emotion interfering with the functions of the body, *and* to organic disease. Others cannot be produced either by emotion or excessive demand on normal function, and can only be due to conscious or subconscious intervention of the mind in the affairs of the body or to direct action on the body. Distinction within this group is, however, seldom

difficult. Signs which conform to anatomical fact and physiological law must be organic; signs which fail in this respect can only be explained in terms of processes of mind. A third group can only be produced by a pathological process of the body, their nature ruling out all other possibilities. A large heart must be due to dilatation, a consequence of organic disease, or to hypertrophy, a reaction to increased demand on function. No emotional stimulation or subconscious intervention of the mind in the affairs of the body can paralyse a single muscle or diminish the entry of air into one lung. Mind can influence structure, but the power of the mind does not extend as far as that. Provided signs of this kind are certain, the patient must be suffering from organic disease even if his other signs are all of psychogenic origin. Hence the pride of place of certain physical signs, and the importance, as we all know, of the routine examination of every patient.

Nevertheless, even when no abnormal physical signs can be found, impressions gained from the history often add up with unexpected accuracy, to suggest that a patient's symptoms are due either to an excessive demand on normal function, to an organic pathological process interfering with his body or his mind, to a psychosomatic condition, or to a psychoneurotic reaction of his mind interfering with the functions of his normal body. Moreover, when he is clearly suffering from some organic condition, the combination of functional disturbances and structural changes in relation to his age and the length of his history is often sufficiently characteristic to suggest that a congenital defect, malnutrition, injury, chemical poisoning, new growth, or the degenerative processes of advancing age (it is often worth while to go through the list systematically) is the cause of the symptoms of which he came complaining.

A clinical diagnosis in this sense—a diagnosis based on the history, in so far as it can be obtained, and a physical examination, carried out as completely as circumstances permit—that is to say, a diagnosis on the evidence immediately available, is, I would have thought, necessary in every single case. Whether an X-ray examination or laboratory tests are required to confirm or extend it, or exclude some dangerous although less likely condition, is often a very difficult decision, and must depend, it seems to me, on an assessment of the chance of being right on clinical evidence alone, and on the chance of any condition from which the patient might be suffering being amenable to treatment. In fact it depends on an estimate of probability.

Initial diagnosis, on which so much depends, therefore can seldom be scientifically exact (as administrators of medicine sometimes forget), and for this reason there is a natural tendency today to make more and more use of the many investigations which can now be called upon to help in the diagnosis of a difficult, or paint the picture more completely of an interesting, case. Moreover, these are steadily increasing in number and complexity, and we can now shelter behind them in almost every case if we feel disposed, particularly as patients are increasingly tending to demand them themselves instead of relying on our clinical judgment. But we cannot afford to be too extravagant and a halt in their use sometimes must be called. One thing is certain. Clinical diagnosis should always go before and laboratory investigations follow after. (In the midst there must often be much hard thinking.) If the order of the procession is reversed investigations tend to pile up and the management of a case may go seriously astray. Besides, we must be prepared to take some risk, after exercising all reasonable care, and even refuse investigations sometimes when they are demanded by patients, or practical medicine will soon become impracticable. When a patient is clearly beyond human help an accurate diagnosis is likely to be quite irrelevant to treatment and, therefore, investigations correspondingly unnecessary. Moreover, they should not be carried out merely as a shield against criticism, seldom ordered for our own interest alone, and except for research purposes seldom considered, particularly in old people, unless likely to yield results on which therapeutic action might be taken. Only if we adopt a definite policy on these lines shall we keep their charge on recurrent expenditure from rising (leaving more money for capital development) and reduce the unnecessary discomfort which they cause and the unnecessary anxiety which they often engender in the minds of our more sensitive patients.

The investigations sometimes necessary to confirm or supplement a clinical diagnosis are of four kinds. Some reveal new subjective symptoms or create new objective signs. The injection of cold water against the tympanic membrane leads to vertigo and nystagmus when the semicircular canals are functioning normally. Others describe subjective sensations or objective signs with greater accuracy than ordinary demands on function, or the tests to which the patient subjects himself, readily permit. For instance, vision is tested by reading Snellen types and hearing by sounding notes of different frequency with increasing intensity: the perimeter maps out a defect in the visual fields, and the audiometer measures the reduction in his range of hearing which the patient had only vaguely noticed himself. A third group extends the ordinary clinical examination of the patient by means of three of our senses, vision, touch, and hearing. Inspection of the shadows cast by tissues in the path of electromagnetic radiation, and looking inside the body by means of tubes, mirrors, and lenses, do not differ fundamentally from the ordinary inspection of the patient. The polygraph records the pulsation in the radial artery which the finger can, and that in the jugular vein which the finger cannot, detect and translates them into a permanent record. An electrophonograph amplifies heart sounds. A fourth group records changes in the physicochemical machinery of the body which are not directly reflected in the subjective sensations or objective signs, a knowledge of which is often necessary for the fuller understanding of disease. Chemical analysis of the body-fluids throws light on metabolic disorders. Immunological technique studies antigen-antibody structure which as yet defies analysis at the chemical level. The string galvanometer records the electrical concomitants of physicochemical changes in the heart and nervous system.

Treatment of the Patient

But there may be no time for investigations. An acute disturbance of bodily function may dominate the situation and demand immediate action on a clinical diagnosis. In another case an acute reaction of the mind has created a scene and order must be restored. In a third case symptoms point to a functional disturbance trivial in itself but pointing in its turn to a pathological process rapidly heading towards disaster, and which must be immediately arrested. More often symptoms point to some disturbance of function which must be relieved while investigations are in progress, or to a reaction of mind which cannot long be ignored, behind which lies some pathological process, which might perhaps have been prevented, and which cannot now be safely left to run its course. These three aspects of treatment make up the art of healing.

The functional balance of the body must be maintained, as far as possible. Demand on failing function should be reduced, but vital functions must, like His Majesty's Government, be carried on at basic level. The respiratory centre or the heart may demand stimulation with drugs; in a long illness enough food must be given to maintain nutrition, and in a short one enough fluid

to maintain hydration and ensure renal secretion. When function fails altogether it can sometimes be operated artificially. Thus the lungs can be ventilated mechanically, a skeletal muscle stimulated electrically, and endocrine function maintained chemically. Substances lost from the body—corpuscles, plasma, salt, water—can be restored. Failing function can often also be relieved by plastic operations, as in the treatment of some congenital defects, transplantation of tendons in long-standing paralysis, and fixation of joints in chronic arthritis. In many cases the treatment of failure of a function coincides with the treatment of the pathological process. Thus excision of the lens lets light into the eye, and removal of the prostate urine out of the bladder.

On the other hand function out of proportion to the needs of the body must be curtailed. The activity of a gland can be reduced by ligation of some of its vessels, removal of part of its substance, division of its nerve-supply, or the administration of drugs. Alternatively its secretion can be neutralised chemically or countered pharmacologically. Spasm of plain muscle can be relieved by stimulating sympathetic or inhibiting parasympathetic nerve-endings. Hyperpyrexia can be controlled by promoting evaporation, and an unproductive cough relieved by drugs which depress the respiratory centre. The rapid division of cellular tissue can be inhibited by radiation. Pain, irritation, and sleeplessness can be relieved by hypnosis and by drugs. Pain can often be relieved without drugs if the mechanism of its production is understood; for instance, by minimising demand on function, preventing movement, reducing congestion, and relieving tension. Severe pain can sometimes be relieved by blocking pathways in the nervous system, temporarily by means of drugs, permanently by their division with the knife and by the operation of leucotomy.

Meanwhile the conscious reactions of the patient's mind can seldom be ignored. Every patient reacts to the pain, discomfort, anxiety, and curtailment of his life which result from his disease. Normal reactions demand sympathy and understanding, but the patient who reacts too little must be frightened into taking more, and the patient who reacts too much encouraged to take less, care of his physical health. Psychotherapy, which the psychoneurotic reactions demand, depends on the influence which one mind can exert directly on another through the ordinary channels of communication between them, and demands a natural capacity for sympathetic understanding of another person's problems which can be bred out of existence by an unbalanced scientific training. It relies mainly on persuasion, suggestion, and reason, based on an appeal to self-interest or, when self-interest and social duty conflict, to accepted moral standards. Psycho-analysis goes further, and attempts to unravel the past development of the individual mind in relation to emotional reactions to experience, which contribute to the development of personality, and release repressed emotion which is causing mental tension. The patient is compelled to live through his emotional experience again, and learn the cause of his previous fears and obsessions so that he will be able to adapt himself more satisfactorily in the future to circumstances outside his control. The reactions of the mind can also be modified through the physiology of the underlying brain. Some drugs detach the mind from reality, others release inhibition. Many depress the higher functions of the nervous system and can be used to rest the mind. A few reduce reaction times, raising the efficiency of the mind for a while a little above its average level, and are of some value in the treatment of depression.

But psychotherapy may cut no ice. Treatment of a functional disturbance of the body, attention to general health, or alteration of environment alone, may be of little avail. There may be no known pathological process active in the body. Under these circumstances treatment must attempt to alter the psychosomatic constitution of the patient (which in some way has rendered his body liable to succumb more easily to emotional stimulation or his mind to physical ill health), and must be directed to mind and body simultaneously in proportion to the part which each is playing in the individual case, the intensity of treatment depending on the degree to which his personality has changed already or was at fault from the beginning. True, human experience suggests that inward conviction may result in a revolution of human personality subsequently reflected in alteration of constitution of body, but dramatic changes of this type, however they are produced, transcend our ordinary methods of psychotherapy, and we are compelled either to resort to empirical treatments directed to the brain on which the mind is based, or to attempt to alter the endocrine pattern of the body on which the brain depends.

Convulsions induced by chemical substances or by electrical stimulation of the motor cortex seem to be of some value in depression, and insulin hypoglycæmia to be of some use in schizophrenia. Prefrontal leucotomy dissociates the emotional from the intellectual reactions of the mind, and will often reduce an agitated, depressed, or excited patient to a socially more manageable state, but usually at the expense of some deterioration in his personality. The same operation, the results of which are always difficult to predict, is also said to abolish mental symptoms in severe anxiety states, although it often leaves the associated physical symptoms unchanged. We must wait to see to what extent (if any) structural changes in the body, such as simple ulcer, and functional disturbances, such as high blood-pressure, will respond to personality change produced by operations on the brain.

Alternatively we can attempt to alter the endocrine pattern of the body which is well known to have influence on the reactions of the mind. Thyroid will certainly restore the intelligence in myxœdema, and some of the mental symptoms of thyrotoxicosis respond to thyroidectomy and thiouracil. The sex hormones are known to relieve the physical and mental symptoms associated with the constitutional change through which women pass at the menopause, and are of some value in restoring normal secondary sexual characteristics and normal instinctive reactions in people suffering from deficiency of the internal secretion of their reproductive glands, although they will not convert a homosexual into a heterosexual person or influence instinct appreciably when the endocrine system is normally balanced. (Reactions of the latter kind are at a higher level of development of personality.) But the recent discovery that an extract of the suprarenal cortex will relieve the symptoms of many of the rheumatic diseases, suggesting that some people are predisposed to succumb to adverse factors in environment by the peculiar endocrine balance of their body, raises altogether new possibilities. Further, the fact that 'Cortisone' may have a profound effect on the reactions of the normal mind suggests that we may acquire the power to relieve physical diseases of certain kinds by means of related substances, only at the expense sometimes of altering the patient's psychosomatic constitution in such a way that he reacts differently to experience in future. On analogy with drugs, any change of personality produced is likely to be for the worse rather than for the better. That is all that can be said, I think, at present.

Genetic disease could be prevented to some extent by the eugenic control of marriage, if that was practicable; but the compulsory sterilisation of the genetically unfit would be unlikely to prove very effective, because of the pool of recessive genes latent in the general

population. It is sometimes possible, however, to remedy a genetic defect as in a plastic operation for hereditary cleft palate or in splenectomy in familial acholuric jaundice. A hæmolytic reaction in a newborn child can be treated by transfusion with Rh-negative blood, but damage to the fixed tissues cannot be undone, and it is difficult to see how risks of this kind are to be prevented. But it is possible to control to some extent the internal environment which the potential mother provides for her developing child and prevent some of the other diseases which can be acquired at birth during intra-uterine development. Every pregnant woman can be Wassermann-tested, and should avoid the risk of infection, particularly virus infection, during the first three months of pregnancy. Antenatal supervision ensures the diet which fœtal growth demands, reduces the risk of severe toxæmia, and anticipates obstetric complications.

I can refer only very briefly, in order to complete my picture, to the prevention and treatment of disease due to pathological processes apparently acquired during life. The risk of accidents and chemical poisoning can be reduced by legislation, and the prevention of malnutrition is a problem of social administration and individual education. Infective disease can be prevented to some extent; sometimes by reducing the risk of exposure to infection, as in tuberculosis; sometimes by raising natural resistance, as in inoculation against typhoid; sometimes by reinforcing the natural defences of the body, as in passive immunisation against diphtheria; and sometimes by maintaining a sufficient concentration of antibiotic in the blood, as in the prophylaxis of malaria. Established infection can sometimes be overcome by reinforcing the body with preformed antitoxin, but far more often far more successfully by so altering the internal environment of the patient with chemotherapeutic or antibiotic substances that pathogenic organisms cannot continue to live and multiply in his body. Nevertheless, in spite of spectacular advances in therapeutics in this direction recently, surgical excision is still the treatment of choice in some chronic infections, and in most varieties of malignant disease, unless the necessary operation is too mutilating or the risk entailed to life too great. Radiation is the best treatment for a few types, and will relieve pain and slow the progress of the disease in inoperable cases. Stilbœstrol will inhibit the progress of carcinoma of the prostate. But the world still waits for a chemotherapy for cancer. It is not impossible. Let us hope, however, that science will never discover any method for slowing down, in the fullness of their time, the otherwise inevitable degenerative changes of advancing age.

The Practice of Medicine

As medicine advances, our responsibility increases. There can be no escape from that conclusion. It is already difficult to decide when and how many new treatments should be used. For, unlike mechanical engineers or commercial chemists, we are seldom faced with clear-cut material problems as teachers, ignorant of the real nature of medical practice, sometimes suppose. Many other considerations have to be taken into account, and again and again we have to take risks, for to a large extent we are often working in the dark. Moreover, medical practice deals in a peculiarly intimate way with people in distress and with the hopes and fears of individual finite lives. It demands, therefore, insight, personality, and understanding. It is true that more scientific knowledge may be necessary as medicine becomes technically more difficult, and that critical ability and intellectual honesty, not a monopoly of the scientific mind, are required more than ever before. But medicine must often reckon with abstract values of which science by the nature of its method cannot, and with moral problems of which science by the nature of its matter need not, take account. Medicine cannot altogether evade the question of what the individual man should be. I sometimes think that the unbalanced scientific training which our universities provide is an inadequate education for a man or woman destined to spend his or her life in the practice of the art of medicine.

The prevention of disease on a large scale in many parts of the world is rapidly leading to increases in population which must inevitably result in famine unless food-supplies are soon increased or the voluntary restriction of births, which is contrary to nature, comes into operation sufficiently soon to prevent disaster, which is distasteful to human sentiment. But problems of this kind lie outside our individual control possibly largely outside human control. We, as doctors, are mainly concerned with the individual man, woman, or child, with one individual problem after another; and the general practitioner, among other problems of this kind, with the prevention of disease in his potential patient. He must make up his mind as to the extent to which it is worth trying to prevent it before it starts, or diagnose it before it has passed the stage at which it can be treated, by encouraging over-careful living at the expense of loss of morale, or by insisting on repeated investigations at a considerable cost to the State. He too must decide when to advise birth control on account of poverty or housing difficulties, and the circumstances under which the termination of a pregnancy is justifiable. He is confronted with many problems which he little thought of in his student days. To what extent is it reasonable to relieve pain, or to allow a patient to avoid work, or gain this or that privilege, when things are short, on a medical certificate? To what extent should he help a person to avoid punishment on the strength of medical evidence? When should he approve an operation on the brain to solve the social problem created by a disorder of the mind or use endocrine preparations, as may be possible in the future—medicine being in a rapidly progressive, experimental, and correspondingly dangerous phase—to relieve physical symptoms, at the price of some deterioration in his patient's personality? When should he allow a man to refuse the operation which might save his life now that surgery has become so safe? When should he advise an operation merely to prolong life when by all ordinary standards his patient's life has long since ceased to be worth living? When, by deliberate non-intervention, is he justified in letting his ageing patient depart this life in peace?

Unfortunately recent advances in medicine, which have precipitated or aggravated so many of these problems, have led to a loss of confidence all round: the doctor in his capacity to deal with many of his patients; the patient even in the doctor of his choice; the State in the doctor; and the doctor in the State. Hence, the flight from the general practitioner to the specialist who sees his patient divorced from his natural environment: the pregnant woman in the antenatal clinic away from her husband; the infant in a welfare centre away from its home; the child in school away from its parents; the man at work away from his wife; or the suspected case of this or that in his special clinic. What opportunity has he to size up the situation as it affects an individual private life? And yet the biological characteristics of man are such that the family must remain his unit of society. Far too often, I think, are they forgotten. Children are dependent on their parents well into their 'teens, the next child normally arriving when the last is still at nursery age. Boys and girls reach sexual maturity many years before they reach physical maturity, marriage being delayed by universal consent in civilised countries. Men and women live for years, and often do their best work, long after

active sexual life is over, and eventually become dependent on their children as their children once depended on them. These are statements of fact, differences between the animals and man. Human health, particularly health of mind, depends to a large extent on the maintenance of family life, one of the privileges of the human race which modern economic conditions, easy divorce, and communist theory—the last two, it seems to me, based on sentiment rather than biology—are tending to disrupt. Unfortunately the influence of the family doctor is slowly waning as the structure of society is changing at a time when we have no agreed philosophy of life.

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In these two lectures I have endeavoured to outline a concept of medicine as a single undivided whole such as an ordinary mind can grasp and on which we might all to some extent agree. I have therefore described, as I see it, the nature of disease, about which we still know little; the nature of the patient, about which we know less; and the nature of the practice of medicine, which grows more difficult, I sometimes think, almost every day.

Nevertheless, the power of medicine over human minds and human bodies "has increased, is increasing, and is likely to increase still further." I do not suggest that this power should be reduced, as Dunning once moved in the House of Commons of the increasing power of the Crown. But I do venture to remind you that there is danger in power. There is always danger in power, particularly in power acquired before we have decided how it should be wielded, as the release of atomic energy has recently revealed. Safety in the face of coming advances in biophysics and biochemistry seems to me to lie only in the freedom of the patient to choose his own doctor, and in the freedom of the doctor to choose his own treatment. Moreover the family doctor, properly trained, guided by specialist advice, and knowing all the circumstances of the individual life, should be the person mainly responsible for deciding when the increasing power of modern medicine should be used, in spite of the increasing responsibility which moral decisions of that magnitude entail.

There are difficult problems but of one thing I am absolutely certain. Medicine must be organised centrally, but until we reach an agreed philosophy of life, and that prospect seems infinitely remote, I am convinced—I here venture to claim to speak above the political level—that the nature of the patient is such, and that the nature of his or her disease is such, and that the nature of medical practice is such, that under no circumstances, and in no country, and at no time, should the growing power of medicine ever be handed over unfettered to the State.

". . . The use of the term 'psychosomatic medicine,' as if it were something new, has become widespread in this country. In terms of research psychosomatic medicine may justifiably be considered an independent discipline, but regarding treatment of patients it is hardly more than *good* medicine with equal consideration of all factors involving the patient—physical, emotional and environmental—and with the special therapeutic skill of the psychiatrist called upon when indicated. The somewhat confused emphasis on psychosomatic medicine in this country may be partly a result of the isolation of the hospital patient from the physician who really knows him from taking care of numerous minor ailments and who knows his failings and his vagaries through knowledge of his family setting and as a member of a community. However, the psychosomatic point of view in medicine or, in other words, consideration of the patient as a whole is one of the essential attributes of the family physician."—J. A. HALSTED, *New Engl. J. Med.* Nov. 9, 1950, p. 732.

OBSERVATIONS ON A PROZONE PHENOMENON ENCOUNTERED IN USING THE ANTI-GLOBULIN SENSITISATION TEST

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IN the course of investigations on the use of the anti-globulin test for detecting red cells sensitised with human antibody, van Loghem et al. (1950) observed that the cells from three cases of acquired hæmolytic anæmia were negative when tested with low dilutions of some anti-globulin sera. When cells from these patients were tested with more dilute samples of the same anti-globulin sera, however, a positive result was obtained. This prozone effect is shown in table I (taken from van Loghem et al. 1950).

On further testing various dilutions of one of these anti-globulin sera (no. 132) against Rh-positive cells sensitised with various dilutions of incomplete anti-D antiserum, it was observed that the prozone effect depended on the concentration of the sensitising antibody (anti-D) as well as on the concentration of the anti-globulin serum used (table II). The diluent for these tube tests was normal rabbit serum, diluted 1 in 20, from which agglutinins against human cells had been absorbed. When saline was used as a diluent, the reading of agglutination with the microscope in those tubes containing highly diluted serum was difficult and untrustworthy.

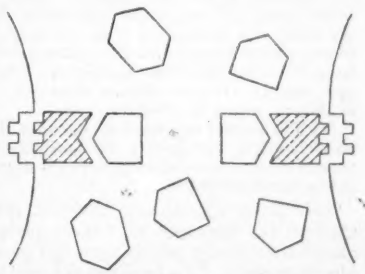


Fig. 1—Parts of two red cells, each carrying an incomplete anti-D molecule. An "incomplete form" of anti-globulin antibody is attached to each globulin receptor, preventing agglutinins from combining. Both forms of anti-globulin antibody are in excess.

An example is also given in table II of a powerful anti-globulin serum, no. 1914, which did not exhibit the prozone phenomenon. It was thus felt that further investigation into the cause of this prozone effect would be of interest.

Two possible explanations suggested themselves:

(1) That the anti-globulin sera contained not only powerful agglutinins operating to a titre of about 1/500,000 but also an "incomplete form" of anti-globulin antibody of a much

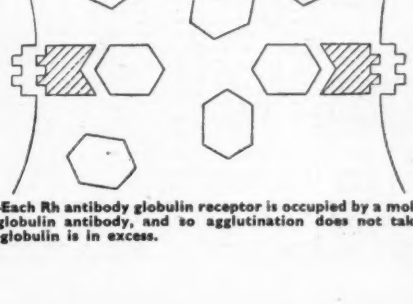


Fig. 2—Each Rh antibody globulin receptor is occupied by a molecule of anti-globulin antibody, and so agglutination does not take place. Anti-globulin is in excess.

Rh (D) receptor shown on part of surface of red cell as depression with specific shape.

Molecule of D antibody shown with configuration at one end responsible for its antibody specificity, and with receptor at other end common to human globulin.

Molecule of anti-human-globulin representing agglutinin with two valencies.

Hypothetical configuration to represent molecule of incomplete anti-human-globulin with only one operative valency.

Molecule of human γ-globulin with human globulin receptors at both ends and no specific antibody groupings.

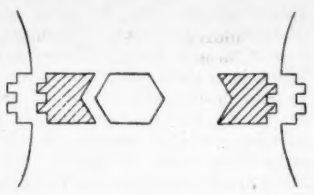
Key to figures 1–6

The figures are designed to represent as accurately as possible the serological properties of the reagents and have no other significance.

lower titre. It might be postulated that the incomplete antibody was more avid than the agglutinin and, in combining preferentially with the globulin receptors on the sensitised cells, blocked them against the action of the agglutinin (see fig. 1). In the higher dilutions, however, only the agglutinin would be effective.

(2) The second explanation was that the phenomenon was an inhibition due merely to antibody excess, such as is encountered in certain precipitation systems. This explanation is represented in fig. 2.

This latter hypothesis, however, does not necessarily exclude the presence of "incomplete forms" of anti-globulin antibody which may fail to exert a significant blocking effect. The hypothesis merely lays the responsibility of the causation of the prozone on the excess of the "agglutinating" antibody, whether or not an "incomplete form" is present in the serum. Furthermore, this hypothesis does not exclude the possibility that in some anti-globulin sera a "blocking form" of antibody may be present and cause an inhibition zone over a range similar to that observed here. Though the two theories are not mutually exclusive, the evidence which we present in the following experiments favours the second.



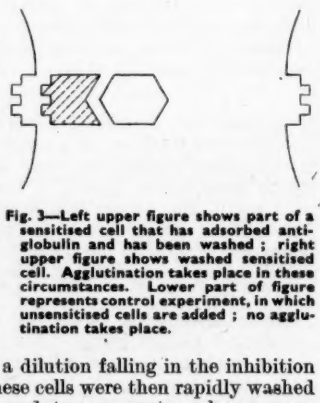


Fig. 3—Left upper figure shows part of a sensitised cell that has adsorbed anti-globulin and has been washed; right upper figure shows washed sensitised cell. Agglutination takes place in these circumstances. Lower part of figure represents control experiment, in which unsensitised cells are added; no agglutination takes place.

EXPERIMENT I

A 3% suspension of red cells group O, cDE/cde was allowed to react with an equal volume of incomplete anti-D antiserum (diluted 1:200) for 20 minutes at 37°C. These sensitised cells were then washed four times in saline and, some being set aside, allowed to react for a further 20 minutes at 37°C with an equal volume of anti-globulin serum in a dilution falling in the inhibition zone (one in three). These cells were then rapidly washed three times in saline, and two separate volumes were placed on a clean white glass tile. To one volume was added an equal volume of cells sensitised only with incomplete anti-D (cells set aside as above), and to the other part washed unsensitised cells were added. The results, read after 3 minutes, are given in table III.

It will be noticed that after the sensitised cells, which had been saturated with anti-globulin antibody, had been washed, the supernatant fluids, both from the last washing and from the test cell suspension, were tested against cells sensitised with incomplete anti-D, to demonstrate that no free or dissociated anti-globulin antibody remained. The experiment has been repeated several times both in Amsterdam and at Cambridge independently with the same result.

TABLE I—AGGLUTINATION OF RED CELLS FROM THREE PATIENTS WITH HÆMOLYTIC ANÆMIA BY ANTI-HUMAN-GLOBULIN SERA

Patient	Anti-globulin serum no.	Dilutions of anti-globulin sera													
		1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	1:512	1:1024	1:2000	1:4000	1:8000	1:16,000	1:32,000
1	132	−	−	−	−	±	++	++	++	++	+	+	+	±	±	±
2	196	−	−	−	−	±	+	++	++	++	++	++	++	++	++	++
3	196	−	−	−	−	±	−	−	±	±	−	−	..	..	..	..

TABLE II—AGGLUTINATION OF RH-POSITIVE RED CELLS, SENSITISED WITH VARIOUS DILUTIONS OF INCOMPLETE ANTI-D ANTISERUM, BY ANTI-HUMAN-GLOBULIN SERA

Anti-globulin serum no.	Dilutions of incomplete anti-D antiserum	Dilutions of anti-globulin serum in normal rabbit serum diluted 1:20																		
		1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	1:512	1:1024	1:2048	1:4096	1:8192	1:16,384	1:32,000	1:64,000	1:128,000	1:250,000	1:500,000	Normal rabbit serum 1:20
132	1:64	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	−
	1:256	−	−	−	±	+	++	++	++	++	++	++	++	++	++	++	++	++	++	+	−
	1:512	−	−	−	−	−	−	+	++	++	++	++	++	++	++	++	++	++	++	+	−
	1:1024	−	−	−	−	−	−	−	−	−	±	++	++	++	++	++	++	++	++	(+)	−
	1:2048	−	−	−	−	−	−	−	−	−	−	±	++	++	++	++	++	++	±	−	−
	1:4096	−	−	−	−	−	−	−	−	−	−	−	−	±	+	+	±	±	−	−	−
1914	1:64	++	++	++	++	++	++	++	++	++	++	++	++	++	−	−	−	−	−	−	−
	1:256	++	++	++	++	++	++	++	++	++	++	++	++	+	−	−	−	−	−	−	−
	1:512	++	++	++	++	++	++	++	++	++	++	++	++	+	−	−	−	−	−	−	−
	1:1024	++	++	++	++	++	++	++	++	++	++	±	±	−	−	−	−	−	−	−	−
	1:2048	++	++	++	+	±	±	−	−	−	−	−	−	−	−	−	−	−	−	−	−
	1:4096	+	+	±	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Discussion

This result supports the hypothesis that excess of antibody may be the cause of the inhibition, as illustrated in fig. 3. If the test cells are saturated with an anti-globulin agglutinating antibody, it is likely that agglutination would be brought about by the addition of more antigen-combining groups. It must be remembered that in this system the antigen-combining groups are probably molecules of antibody globulin attached to the cells, and therefore, to furnish more antigen groups, it is necessary merely to add sensitised cells, as in this experiment; this step caused the cells to agglutinate powerfully. The addition of normal unsensitised cells provides no new antigen receptors, and no agglutination would be expected; in fact, no agglutination was observed. It can be seen that the validity of these deductions depends on the thorough washing of the cells at each stage.

It is evident that the result of this experiment does not favour the hypothesis of an "incomplete form" of anti-globulin antibody as the cause of the prozone effect, for the addition of sensitised cells would be unlikely to influence the properties of the cells saturated with a "blocking form" of incomplete anti-globulin antibody (see fig. 4).

TABLE III—THE AGGLUTINATION OF RED CELLS, SENSITISED WITH INCOMPLETE ANTI-D SERUM AND WITH ANTI-GLOBULIN SERUM IN THE INHIBITION ZONE, AND SUBSEQUENTLY WASHED BY CELLS SENSITISED WITH INCOMPLETE ANTI-D ANTIBODY.

To	Cells sensitised with incomplete anti-D and with anti-globulin serum in the inhibition zone and subsequently washed			Cells sensitised with incomplete anti-D and subsequently washed (control cells)	
Added	Cells sensitised with incomplete anti-D and subsequently washed	Washed unsensitised cells	Saline	Saline	Supernatant fluids from washed antiglobulin saturated cells
Results	+++	−	−	−	−

EXPERIMENT II

A further attempt was made to strengthen the view that excess of antibody was the cause of the inhibition. Cells prepared as in experiment I (sensitised with incomplete anti-D and subsequently with anti-globulin in the inhibition zone and washed thereafter) were added on a tile to a series of dilutions of 2½% human γ-globulin (Cohn fraction). After preliminary experiments suitable dilutions of globulin were found. The results, read at 3 minutes, are given in table IV. Further controls for this experiment are discussed later.

Discussion

If the sensitised cells were saturated with an anti-globulin agglutinating antibody, it could be argued that very small quantities of globulin might combine with the free "valencies" on two or more cells and so cause agglutination (see fig. 5). In these circumstances, in fact, very strong agglutination took place. A large quantity of globulin, however, would merely saturate all the available combining sites without causing agglutination (see fig. 6). It is difficult to see how this result could be adduced in support of an "incomplete form" of anti-globulin causing inhibition through blocking. If, on the one hand, the "incomplete forms" of antibody fail to bring about agglutination by being univalent, it would not be expected that the addition of globulin to the test complex would so alter this "univalent" property as to cause agglutination. If, on the other hand, the agglutination of sensitised cells is less an expression of the properties of the antibody and rather an effect of the medium in which the test is conducted—e.g., albumin, or other serum-proteins—it could not be argued that the addition of a 1 in 100,000 dilution of 2½% γ-globulin would so alter the environmental conditions physically as to bring about agglutination. Indeed, this concentration of globulin does not cause agglutination when added to cells strongly sensitised with incomplete anti-D. We therefore regard this experiment as additional support to the hypothesis that the inhibition phenomenon is due to excess of antibody rather than to a "blocking form" of antibody.

TABLE IV—THE AGGLUTINATION OF RED CELLS, SENSITISED WITH INCOMPLETE ANTI-D SERUM AND WITH ANTI-GLOBULIN SERUM IN THE INHIBITION ZONE AND SUBSEQUENTLY WASHED BY HUMAN γ-GLOBULIN.

To	Cells sensitised with incomplete anti-D and also with anti-globulin in the inhibition zone and subsequently washed					Cells sensitised with incomplete anti-D and subsequently washed (control cells)	
Added dilutions of 2½% human γ globulin	10^{-3}	10^{-4}	10^{-5}	10^{-6}	Saline	10^{-4}	Saline
Results	−	+++	+	−	−	−	−

OBSERVATIONS ON TECHNIQUE

The experiments described have been repeated several times with unequivocal results. However, during the early stages of this work the controls on several occasions showed very weak agglutination, particularly when the experiments were conducted in tubes. This irregularity necessitated further experimental investigation into the controls of the reagents employed. These experiments are not described, but it was felt that some of the conclusions drawn from this work should be mentioned for the assistance of those who may wish to use this system for further investigations. Certain optimal conditions were found to be desirable. The red-cell suspension gives the best results at a concentration of not less than 3%. To obtain good inhibition it is desirable not only to use the anti-globulin serum at a dilution well within the prozone but also to sensitise the cells with the weakest dilution of incomplete anti-D that will furnish a strong agglutination in the presence of the optimal concentration of anti-globulin. The anti-globulin sera had been heated to 56°C for 30 minutes.

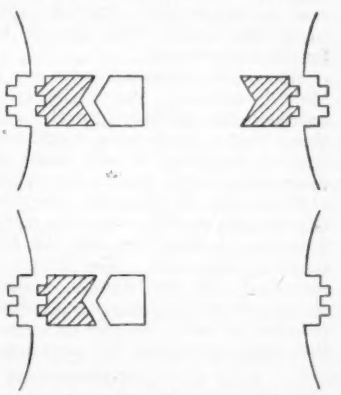


Fig. 4—Sensitised cells on left have adsorbed an "incomplete form" of anti-globulin and have been washed. The addition of washed sensitised cells (upper right) would not be expected to cause agglutination (cf. fig. 3).

Perhaps the most important observation made was the necessity for thoroughly washing at the start the red

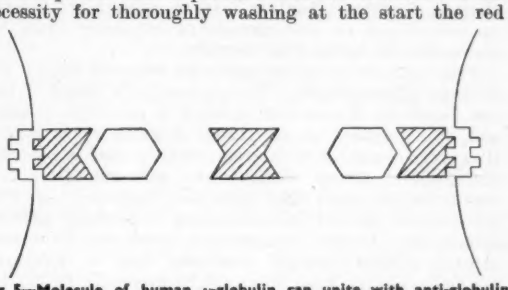


Fig. 5—Molecule of human γ-globulin can unite with anti-globulin adsorbed on to sensitised cells, and agglutination results.

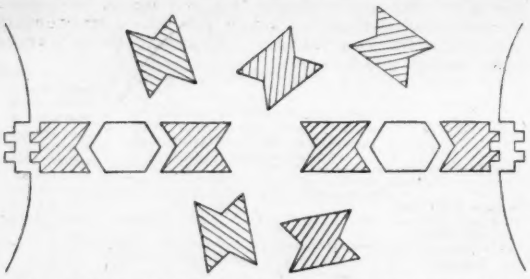


Fig. 6—Excess of globulin. Combining sites are saturated, and agglutination does not take place.

cells to be used for the normal cell control. It was shown that at least four washings were necessary. If the cells were washed twice or three times, a trace of serum-globulin remained in association with the cell suspension and brought about weak agglutination of the sensitised cells saturated with anti-globulin antibody. The mechanism of this weak agglutination is thus the same as that shown in experiment II. When the cells were washed four, five, six, or seven times, this effect was not observed. The cells after sensitisation with incomplete anti-D must likewise be washed four times for the same reason.

When the sensitised cells are saturated with anti-globulin antibody, the possibility of dissociation of the anti-globulin antibody from the cells required consideration. This might happen spontaneously over a period of time on standing, or as a result of centrifuging. Such dissociation might lead to the spontaneous agglutination of these cells. For this reason we preferred to perform our experiments on a tile, where the results might be read after 3 minutes, rather than risk the delay involved at this stage by a tube test. The fact that the sensitised cells, saturated with anti-globulin antibody and washed four times, were still unagglutinated after 10 minutes on a tile (whether or not a volume of saline was added) showed that dissociation was not complicating our results.

CONCLUSIONS

It has been found that some anti-human-globulin sera, when tested against red cells weakly sensitised with human globulin, exhibit a prozone. The clinical significance of this observation is that, by employing such an anti-globulin serum diagnostically, falsely negative results may be obtained. To overcome this difficulty it is necessary to examine the anti-globulin sera in routine diagnostic use to detect whether such a prozone is present. This step consists merely in titrating the anti-globulin serum against cells weakly sensitised with incomplete anti-D. It should be remembered that the anti-globulin sera should have been thoroughly absorbed with washed human cells, for weak heterogenetic agglutinins against human cells might mask the presence of a prozone. Any anti-globulin serum showing a significant prozone should be rejected from routine diagnostic use, for it cannot be maintained on the evidence available at present that an "optimal dilution" of an anti-globulin serum as determined on one sample of sensitised cells will necessarily be optimal on another.

Possibly only a few anti-globulin sera will exhibit this prozone phenomenon. The experiments detailed here are based on one serum showing a powerful prozone, and van Loghem et al. (1950) describe three others. However, it can be seen from table II that a powerful anti-globulin serum without any prozone effect may readily be obtained. The table also illustrates that even anti-globulin sera of this kind must be carefully assessed before use. If our anti-globulin serum no. 1914 were titrated against strongly sensitised cells to determine the agglutinating dose, it would be necessary to use the serum at a strength of 128 agglutinating doses to detect weakly sensitised cells effectively. The strength of anti-globulin sera should therefore be investigated thoroughly, so that they may be used at a dilution which will detect weakly sensitised cells.

The serological significances are twofold. First, our experiments support the hypothesis that the prozone effect observed with this serum was due to inhibition by excess of antibody. It does not seem possible to explain these results on the assumption that this inhibition was caused by a "blocking form" of incomplete anti-globulin antibody. However, it would not be denied that "incomplete forms" of antibody might be encountered in other anti-globulin sera, nor that they might cause a prozone effect. Indeed, our observations and other experiments not reported here demonstrate several unexplained properties of anti-globulin sera which are now being investigated. This paper is concerned solely with the cause of the prozone phenomenon encountered in one anti-globulin serum.

Secondly, it seems possible that the experimental results may be adduced as evidence in favour of the multivalence of antibodies, at any rate of the anti-globulin antibody. The term multivalence is here used to include bivalence; it does not seem possible or significant for the present argument to distinguish between bivalence and multivalence. We therefore use only two alternative terms, univalence and multivalence.

These experiments seem to demonstrate that, when sensitised cells are saturated with anti-globulin antibody, one valency is at this stage occupied by union with the globulin-combining unit attached to the red cell. This complex may then be thoroughly washed free from all other materials, and then, by the sole addition of a suitable concentration of γ-globulin, agglutination can be brought about. The reaction at this second stage seems to indicate that one or more hitherto unsatisfied valencies are brought into combination with antigen. In summary, it appears that one valency of the antibody may be occupied at one stage of the experiment and, after all other material has been washed away, a second valency or more valencies may be satisfied at another stage, judged by the visible result of agglutination.

We wish to thank Mr. H. P. Hudson and Mr. C. Patman for photographing the diagrams.

REFERENCE

van Loghem, J. J., Kresner, M., Verheul, C. (1950) *Maandschr. Kindergeneesk.* **18**, 115.

GAMMA GLOBULIN IN THE PREVENTION AND ATTENUATION OF MEASLES

CONTROLLED TRIALS IN DAY AND RESIDENTIAL NURSERIES *

A REPORT TO THE MEDICAL RESEARCH COUNCIL

THE gamma-globulin fraction of normal human plasma, prepared by the method of Cohn and his associates (1944), has been shown by Stokes et al. (1944), Ordman et al. (1944), Greenberg et al. (1944), and a subcommittee of the Medical Research Council (1948) to be a safe and effective agent for the passive immunisation of

* The trials were carried out on behalf of the Gamma Globulin Conference of the Medical Research Council (chairman, Sir ALAN DRURY, F.R.S.) by: Dr. W. C. COCKBURN and Dr. J. A. HARRINGTON of the Central Public Health Laboratory, in collaboration with medical officers of health of municipal boroughs in the county of Middlesex and Sir Allan Daley, F.R.C.P., and the staff in charge of the L.C.C. nurseries; Dr. T. ANDERSON, Knightswood Hospital, Glasgow; Dr. MARGARET SPROUL, senior maternity and child-welfare officer, Salford; Dr. B. J. GRIFFITHS, assistant medical officer of health, Manchester; Dr. A. M.-M. PAYNE, of the Public Health Laboratory Service, Oxford; Dr. A. B. SEMPLE, deputy medical officer of health, Liverpool; and others.

susceptible measles contacts, and to be more potent and less likely to give rise to untoward reactions than agents previously used.

At the Lister Institute of Preventive Medicine, Kekwick and Mackay (1949) developed a method for the preparation of gamma globulin in which the precipitating agent was ether instead of the ethanol used in Cohn's procedure. In 1947–48 a small amount of crude globulin prepared by the ether method was made available for controlled studies in susceptible measles contacts. About 50% of the total protein in this crude globulin was gamma globulin. Some was supplied as a liquid, and some was freeze-dried in separate doses for reconstitution immediately before use. Preliminary studies were carried out mainly in children in day and residential nurseries during a measles epidemic, and, though the numbers were small, the modification in the severity of the illness was found to be substantially greater in children given globulin than in those given adult serum. In view of these findings and the absence of untoward sequelæ a large-scale investigation was organised in day and residential nurseries in preparation for the expected rise in the incidence of measles in the early months of 1949.

DETAILS OF INVESTIGATION

Globulin

The material used in most of the 1949 trials was freeze-dried in doses containing 250 mg. of protein, of which 90–95% was gamma globulin, but in six trials a dose containing 500 mg. of protein was given. Each dose was dissolved in 3 or 6 ml. of sterile distilled water immediately before injection.

TABLE I—COMPOSITION OF TRIALS, SHOWING NUMBER OF NURSERIES IN WHICH MEASLES DEVELOPED WITHIN 21 DAYS OF INOCULATION OF CONTACTS

—	London		Provinces		All areas	
	Total	Measles	Total	Measles	Total	Measles
No. of nurseries ..	30	21	18	12	48*	33*
No. of children on adult serum ..	329	151	128	64	457	215
No. of children on gamma globulin ..	332	149	132	63	464	212
Total children inoculated	661	300	260	127	921	427

* Includes 6 residential nurseries.

Plan of Inquiry

To assess the value of gamma globulin it was necessary to compare the experience of the children given gamma globulin with a similar group of children not so treated, and it was decided to inoculate half the children with 5 ml. of adult serum or reconstituted dried plasma, which previous experience had shown would slightly modify the disease without apparently influencing the attack-rate. (For convenience, both adult serum containing 0·5% phenol and reconstituted dried plasma will hereafter be called "adult serum.")

In each trial centre, medical officers in charge of the investigation made a preliminary visit to the nurseries and explained the details to the matrons and staff, particularly emphasising the need for immediate notice of the first definite or suspected case of measles among the children. With the coöperation of matrons it was possible in all instances to inoculate the presumed susceptible contacts within seventy-two hours of the appearance of the rash in the primary case.

On being notified of the first case in one of the nurseries in his area, the medical officer visited the patient or satisfied himself of the accuracy of the diagnosis by reference to the practitioner concerned. He then made a list of all the susceptible nursery contacts whose parents had consented to inoculation, dividing them into subgroups according to the intimacy of exposure (previously defined for the purpose), with the children in each subgroup in order of increasing age. The names on these lists were then divided into pairs, so the paired children were closely similar in intimacy of exposure and age. One of each pair was inoculated intramuscularly with gamma globulin and the other with adult serum, the choice being decided from lists supplied by Prof. A. Bradford Hill, D.SC., of the Department of Medical Statistics, London School of Hygiene and Tropical Medicine. Prof. Bradford Hill, who also gave much other advice on the planning of the investigation, provided for each area a series consisting of pairs of letters —"G" for gamma globulin and "A" for adult serum—the order in which they appeared in a pair (GA or AG) having been determined by random sampling numbers. Each pair of letters was used once only and then crossed off the list. Thus two similar but randomly constructed groups of children were obtained.

TABLE II—AGE AND SEX DISTRIBUTION OF CHILDREN IN THOSE SECTIONS OF NURSERIES WHERE MEASLES DEVELOPED WITHIN 21 DAYS OF INOCULATION

Age-group (months)	Children on adult serum			Children on gamma globulin		
	Male	Female	Total	Male	Female	Total
6–11 ..	2	6	8	7	3	10
12– ..	35	37	72	44	32	76
24– ..	44	35	79	32	40	72
36– ..	17	13	30	19	15	34
48–60 ..	12	14	26	10	10	20
Total ..	110	105	215	112	100	212
Mean age	29·8 months			28·9 months		
Male : female ratio ..	1·05 : 1			1·12 : 1		

Since it was desirable that the severity of cases should be assessed without the observer knowing which children were in which inoculation group, the details of the inoculum given were noted on a record sheet which was filed away as soon as the inoculations in each nursery were completed, and subsequent clinical observations were recorded on a separate record sheet; the preliminary investigation had shown that it was practically impossible for the observer to remember after inoculating the children whether a particular child had been given gamma globulin or adult serum.

The inoculated children were kept under observation for twenty-one days, and those in day nurseries were visited in their homes during this period if they were absent from the nursery. If none of the contacts developed measles within twenty-one days of inoculation, the trial was closed.

TABLE III—DEGREES OF EXPOSURE IN GLOBULIN AND ADULT-SERUM GROUPS IN NURSERIES WHERE MEASLES DEVELOPED WITHIN 21 DAYS OF INOCULATION

Nature of contact with primary case	Children on adult serum	Children on gamma globulin
Intimate	121	129
Close	73	66
Remote	21	17
Total	215	212

"Intimate" = contacts who played, &c., in the same section of the nursery as the primary case.
"Close" = children in other sections of the nursery who were exposed for short periods, eg., at play or at meals.
"Remote" = contact usually confined to exposure in the entrance hall in the morning or evening, or out of doors during the day.

TABLE IV—CASES IN INOCULATED CONTACTS IN THE GLOBULIN AND ADULT-SERUM GROUPS

Age-group (months)	Globulin group given 225–300 mg. gamma globulin				Globulin group given 450 mg. gamma globulin			
	Adult-serum group		Globulin group		Adult-serum group		Globulin group	
	Contacts inoculated	Cases	Contacts inoculated	Cases	Contacts inoculated	Cases	Contacts inoculated	Cases
6– ..	6	1	8	1	2	1	2	0
12– ..	58	21	62	14	14	6	14	1
24– ..	67	47	60	27	12	11	12	2
36– ..	25	15	29	11	5	3	5	3
48–60 ..	21	14	16	6	5	4	4	2
Total ..	177	98 (55·4%)	175	59 (33·7%)	38	25 (65·8%)	37	8 (21·6%)
—	Difference / Standard error = 21·7 / 5·17 = 4·2				Difference / Standard error = 44·2 / 10·24 = 4·3			

Scope of Inquiry

Trials were carried out in 48 nurseries, of which 6 were residential (table I). In all, 457 children were given adult serum and 464 gamma globulin. In 15 nurseries no contacts developed measles within twenty-one days after inoculation. In the 33 nurseries in which measles developed within the prescribed period there were 215 children in the adult-serum groups and 212 in the gamma-globulin group (table I); only the results in these children were analysed. In 27 of these nurseries, children in the globulin group were given 225 mg. of gamma globulin if under the age of 2 years and 300 mg. if between 2 and 5 years; in 6 nurseries all children in the globulin group were given 450 mg. All children in the comparative groups were given 5 ml. of adult serum.

Comparability of Globulin and Adult-serum Groups

At the conclusion of the trials, the children in the globulin and adult-serum groups were classified by age, sex, and intimacy of exposure, and the two groups were found to be comparable (tables II and III).

RESULTS

Attack-rates (table IV)

In the nurseries where measles developed within twenty-one days after inoculation and where the dosage of gamma globulin was 225–300 mg., the attack-rate was 33·7% in the globulin group and 55·4% in the adult-serum group. Where the dosage of gamma globulin was 450 mg. the attack-rate was 21·6% in the globulin group and 65·8% in the adult-serum group; the numbers in the latter trials were small—37 in the globulin group and 38 in the adult-serum group. The differences in attack-rates in the two groups in both sets of trials were statistically significant.

TABLE V—CHARACTER OF MEASLES RASH IN THE INOCULATED CHILDREN

Type of macules*	Children on adult serum			Children on 225–300 mg. gamma globulin			Children on 450 mg. gamma globulin		
	Face	Trunk	Limbs	Face	Trunk	Limbs	Face	Trunk	Limbs
Numerous semi-confluent	48	33	12	3	2	1	–	–	–
Numerous discrete	46	60	34	10	13	4	–	–	–
Sparse ..	24	26	55	25	25	17	1	4	–
Occasional	3	2	16	17	17	15	6	4	2
None ..	0	0	4	3	1	21	1	–	6
Total ..	121	121	121	58	58	58	8	8	8

* *Note:* In tables V–VII 2 cases on adult serum and one case on globulin have been omitted because the course of the disease in these cases could not be accurately assessed. It was however definitely established that they developed measles within 21 days and they have therefore been included in tables I–IV.

Modification of Severity

Three criteria were used to assess the degree of modification in children who developed measles after inoculation—the character and distribution of the rash, the duration of the prodromal period, and the opinion of the observer on the severity of each attack as a whole. It was felt that in trials of this nature, where regular temperature recordings could not be obtained and where the number of visits which could be paid to the homes of the patients was limited, these were the only criteria which could be satisfied in all cases. As was mentioned, all observations were made and recorded without the observer knowing whether the case was in the globulin or adult-serum group.

(*a*) *Character of rash.*—In each case an attempt was made to assess the number and appearance of macules on the face, trunk, and limbs when the rash was most pronounced in these areas (table V). Of the 121 children on adult serum 78%, 77%, and 38% showed semi-confluent or numerous discrete macules on the face, trunk, and limbs respectively; the corresponding ratios for the globulin group on 225–300 mg. were 22%, 26%, and 9%, while none of the 8 children on 450 mg. of gamma globulin developed a rash to this extent.

TABLE VI—DURATION OF PRODROMAL SYMPTOMS IN THE INOCULATED

Duration (in hours)	Children on adult serum	Children on 225–300 mg. gamma globulin	Children on 450 mg. gamma globulin
No prodromals ..	1 (0·8%)	7 (12%)	4 (50%)
< 24	12 (9·9%)	22 (38%)	4 (50%)
24 –	46 (38%)	18 (31%)	—
48 –	30 (25%)	4 (6·9%)	—
72 + ...	32 (26%)	7 (12%)	—
Total	121	58	8

(*b*) *Prodromal symptoms.*—The globulin and adult-serum groups differed considerably in the duration of the prodromal stage. In the globulin group on 225–300 mg. of gamma globulin, 29 children (50%) had no prodromal illness or one lasting less than twenty-four hours before the appearance of the rash; in the adult-serum group only 13 children (10·7%) were placed in this category; none of the 8 children who developed measles after 450 mg. of gamma globulin had a prodromal period exceeding twenty-four hours (table VI).

(*c*) *Observer's opinion of severity.*—The type of rash and duration of prodromal symptoms did not always give a satisfactory measure of the degree of modification. Some children had a well-marked rash with no apparent constitutional disturbance or pyrexia. In each case of measles following inoculation therefore an attempt was made to assess the degree of modification by taking all clinical findings into account, and each child was assigned to one of four categories, as follows:

Excellent modification: minimal rash, prodromal symptoms very slight or absent, no catarrh or constitutional upset.

Satisfactory modification: rash, catarrhal symptoms, and constitutional upset only slight, with rapid recovery.

Doubtful modification: symptoms and signs that could not readily be distinguished from a mild atttack of the natural disease.

No modification: indistinguishable from a natural typical attack.

Table VII shows that in 93% of cases following 225–300 mg. of gamma globulin and in all of the 8 cases on 450 mg. the signs and symptoms were readily distinguishable from those of the natural disease; whereas in the adult-serum group only 51% of cases showed significant modification. This difference is clearly (and technically) very unlikely to have arisen by chance.

TABLE VII—GENERAL ASSESSMENT OF CASES OF MEASLES IN THE INOCULATED

Prophylactic	Total cases	Excellent modification	Satisfactory modification	Doubtful modification	No modification
Adult serum ..	121	13 (10·5%)	49 (40·5%)	34 (28%)	25 (21%)
Gamma globulin 225–300 mg.	58	33 (57%)	21 (36%)	2 (3·4%)	2 (3·4%)
Gamma globulin 450 mg.	8	8 (100%)	..	..	..

Complications

In the adult-serum group, 5 children developed complications; 1 had bronchopneumonia, 1 gastroenteritis, 1 acute otitis media, 1 purulent conjunctivitis, and 1 bronchopneumonia with purulent conjunctivitis; all recovered.

In the globulin group, complications occurred in 2 children, both on the 225–300 mg. dosage; one developed a recrudescence of a chronic otitis media fourteen days after recovery from a modified attack of measles; the other, who had recently had tonsillitis, developed otitis media and cervical adenitis two days after the rash appeared.

Reactions

Apart from transient stiffness of the limb lasting one or two hours after inoculation in a few cases, no local reactions were observed in the globulin or adult-serum groups. One child in the globulin group developed, three days after inoculation, an urticarial rash which disappeared in twenty-four hours.

DISCUSSION

Effectiveness of Gamma Globulin and Adult Serum

Analysis of the results obtained indicates that gamma globulin prepared by an ether fractionation method is a valuable agent in measles prophylaxis; when given in adequate doses to exposed susceptible contacts within three days of the appearance of the rash in the infecting case it will either prevent or modify the disease in nearly every case. Adult serum in 5 ml. doses, though inferior to gamma globulin in its protective and attenuating action, results in some modification of the attack; in this investigation, 51% of the cases of measles in the serum-treated group were classed as modified.

TABLE VIII—EFFECT OF DEGREE OF EXPOSURE ON THE OCCURRENCE OF MEASLES IN ALL DAY NURSERY SECTIONS IN WHICH SUSCEPTIBLE CONTACTS WERE INOCULATED WITH GAMMA GLOBULIN AND ADULT SERUM

Day nursery section	Contact with infective case		
	Intimate*	Close*	Remote*
Sections where measles developed	26	12	3
Sections where measles did not develop ..	16	23	19
Total	42	35	22

* For definitions see table III.

Dosage of Gamma Globulin

The optimum dose to prevent or modify measles depends on many factors: during the trials it was found impossible to predict for any individual child whether prevention or modification would result. This variation in individual susceptibility, previously noted by Stokes and his associates (1944), makes it difficult to construct a dosage table applicable to all children. Some American workers based their dosage on body-weight, but it was found less difficult and equally satisfactory to base the dosage for children on age. It was clear that gamma globulin in doses of 225–300 mg. prevented measles in some cases, but it could not be relied on to prevent the disease in all children under 5 years of age. The attack-rates for children on 450 mg. of gamma globulin and on 5 ml. of adult serum were, for those aged 6–23 months, 6·3% and 43·8%, and for those aged 24–60 months, 33·3% and 77·3% respectively; in neither group therefore did 450 mg. assure protection.

Supply of Gamma Globulin

In view of the complexity and cost of producing human gamma globulin it seems that it will have to be reserved for contacts in hospitals, and for children whose health is such that an attack of measles would endanger their life. For general use, adult serum or plasma will still have to be relied on.

Duration of Passive Immunity

In some nursery trials in one area, where the children were observed for more than twenty-one days after inoculation with 225–300 mg. of gamma globulin, modification occurred up to six weeks, though its degree decreased rapidly towards the end of this period. With a dose of 450 mg., the duration of protection was more apparent; in one residential nursery trial, during the period 22–42 days after inoculation, 1 out of 15 remaining susceptible contacts in the globulin group developed measles after re-exposure, compared with 7 out of 8 in the adult-serum group; and in another, where the same dosage was used, none of the 10 remaining susceptible contacts on gamma globulin developed measles, compared with 4 out of 7 on adult serum.

These observations support the view (Janeway 1944) that dosage is an important factor in determining the duration of passive immunity, and that, given in adequate doses, gamma globulin may prevent or modify the disease for more than three weeks after inoculation.

Effect of Degree and Intimacy of Exposure

Most of the day nurseries in which trials were carried out were divided into three sections. Susceptible contacts in the same section as the primary infecting case were in nearly all instances intimately exposed, whereas children in other sections were exposed less intimately.

The effect of the degree of exposure on the occurrence of measles in susceptible contacts who were inoculated with gamma globulin and adult serum in 99 separate day-nursery sections is shown in table VIII. One or more cases of measles occurred in 26 (61·9%) of the 42 nursery sections in which "intimate" contacts were inoculated, in 12 (34·3%) of the 35 sections where "close" contacts were inoculated, and in 3 (13·6%) of the 22 sections in which remote contacts were inoculated.

These results suggest the need for consideration before inoculating remote contacts in nurseries. The risk of such contacts developing measles from the primary case appears to be small, and in view of the need for economy in measles prophylactics, it may be advisable to postpone inoculation in such cases until the children are more intimately exposed to secondary cases.

Infectivity of Measles

During the investigation, 9 day nurseries were observed in which the primary infective case had been absent

from the nursery for sixty to seventy-two hours before the rash appeared. Although none of the susceptible contacts in these nurseries had been inoculated, only 1 child developed measles within twenty-one days after exposure. It seems therefore that measles was not readily transmitted in day nurseries by cases which were isolated $2^1/_2$–3 days before the appearance of the rash. In some instances children who developed well-modified attacks after gamma globulin were permitted to return to the nursery seven days after the appearance of the rash; and no secondary cases resulted.

Loss of Potency of Crude Globulin on Storage

In the preliminary investigation a batch of crude globulin held as a fluid was stored at 4°C from March, 1947, to January, 1948. It was used in March, 1947, and gave satisfactory modification. When used in January, 1948, it had lost potency, and in 9 out of 17 close contacts who developed measles within twenty-one days of inoculation there was no evidence of modification. In contrast, a similar dried batch of globulin retained its potency over the same period. For this reason all subsequent batches were dried and reconstituted immediately before use.

RECOMMENDATIONS

On the basis of the results obtained in the trials the following dosage schedule is suggested:

Age of children (mos.)	*Dosage of gamma globulin (mg.) where: modification is desired*	*prevention is desired*	*prevention is essential*
6–23 ..	150–225 ..	450 ..	675
24–59 ..	225–300 ..	675 ..	900

The inoculation should be given within seventy-two hours of the appearance of the rash in the primary infecting case; where this is not possible the dose may have to be increased.

SUMMARY

In a series of controlled trials in day nurseries, gamma globulin was given in 225–450 mg. doses to 212 susceptible measles contacts between the ages of 6 months and 5 years; 31·6% developed measles and 94% of these showed excellent or satisfactory modification. Adult serum was given in 5 ml. doses to 215 contacts of similar age and exposure; 57·2% developed measles, and 48·9% of these showed no (or doubtful) evidence of modification.

The attack-rates for children receiving 225–300 mg. and 450 mg. of gamma globulin were 33·7% and 21·6% respectively; whereas in the corresponding groups of children receiving 5 ml. of adult serum the rates were 55·4% and 65·8%. The duration of passive immunity depended on dosage; with the larger dose some protection for periods up to six weeks was observed.

Recommendations are made on the dose of gamma globulin to be given to exposed children at different ages to modify or prevent an expected attack of measles.

Reactions to the prophylactic injections in this trial were minimal and unimportant.

No serious complications were observed in the globulin group.

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STERILITY DUE TO CONGENITAL ABSENCE OF THE VASA

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IN 1948 Young reported a case of congenital absence of the vas as being the first on record in this country.

In America Engle (1947) noted the condition, Michelson (1947a) reported the vas absent in 4 (3%) of 86 cases of azoöspermia, while both Simmons (1945) and Charny (1945) put the incidence at about 5%. Mazer and Israels (1941), in 308 cases of male infertility, found 45 due to obstructive azoöspermia, of which 4 were due to congenital atresia. The German author Dirr (1940) gave the incidence of atresia as approximately 0·05% in all operations on the vas.

The difference in these figures may be due to the fact that the Germans were sterilising normal fertile males as part of their fantastic racial purity campaign, while American cases were all from subfertility clinics.

In France, Laffont and Ezes (1949) report the condition but say that in half the cases it is possible to do an anastomosis, which in half of these is successful. Such a success-rate is not equalled in reports from clinics in other countries. Bayle (1950) reports an incidence of 4% with 65% cures.

At the Conference on Sterility held in Edinburgh in September, 1949, Tulloch said that the condition is commoner than hitherto believed; and his incidence-rate would probably have been higher if he had not regarded the presence of a palpable cord as evidence that the vas is patent. As the following case shows, it is not reliable evidence.

CASE-REPORT

A man, aged 29, who had been married 4 years, attended the clinic in June, 1949, because of sterility. Azoöspermia had been diagnosed in May, 1949, and confirmed in three successive specimens. He had normal coitus three times weekly, with satisfactory orgasm both for himself and his wife. The wife had been examined at another hospital, and as she was said to be "small," curettage had been arranged, although the diagnosis of azoöspermia had been originally made there!

The man was of normal spare build, with normal hair distribution and adult male voice. There was no evidence of pituitary or other endocrine dysfunction. There was a small left varix. Both testes were in the scrotum; they were small and soft, but testicular sensation was present. Tissues resembling cords were palpable on both sides. The penis was normal in size and shape. I performed a testicular biopsy which revealed active spermatogenesis in both testes. In view of this I advised exploration, which was undertaken by Mr. H. M. Goldberg, F.R.C.S., to whom I am indebted for his help.

Operation.—On delivering the testes through an incision in the upper part of the scrotum, it was seen that both epididymes were small, flattened, and not of the usual shape. The right globus major appeared normal. The lower half of the body and the tail were composed of greatly dilated, thin-walled ducts, filled with a yellowish creamy material. The right spermatic cord was examined, but no trace was found of the vas, or of any rudimentary structure resembling it. On the left side an extremely thin rudimentary vas was found with much difficulty. The lumen was so small that it admitted only a fine hypodermic needle. An attempt was made to inject methylene-blue to determine the patency of the ejaculatory duct. The lower pole of the left epididymis showed changes similar to those on the other side. Microscopically the material aspirated from the right side consisted of amorphous debris, and spermatozoa were not seen.

The tunica albuginea of the left globus major was incised, and the underlying tissue gently opened up. Confirmation that this tissue contained some seminiferous tubules was obtained by pressing a glass slide on the epididymial tissue and finding active spermatozoa under the microscope. These spermatozoa survived more than 2 hours.

A longitudinal incision into the rudimentary vas was made, and the edges were anastomosed to the edges of the tunica

albuginea. Unfortunately subsequent semen analysis has not revealed the presence of spermatozoa. Presumably the vas was too rudimentary to perform its function, or anastomosis was unsuccessful.

METHODS OF TREATMENT

Much work is now being done, particularly in America, on the best method of performing anastomosis. But the successful results reported by some authors (Cameron 1945, Michelson 1946), are for anastomosis of tubes which were originally normal but later became occluded (e.g., after gonorrhœa or by vasectomy). In congenital atresia, on the other hand, maldevelopment may not be confined to the vas, and often extends to other genital structures. Though the actual anastomosis may be successful in these cases, anatomical defects elsewhere may prevent spermatozoa from appearing in the semen.

To keep the anastomosis open, various ingenious methods of utilising silver wire, 'Nylon,' and other materials have been devised (Hagner 1936, Michelson 1946, 1947b and c).

When operation fails, what can be done? Some workers (Schultze 1941, Guttmacher 1942, Sangree 1947) have tried the insemination of sperm obtained by aspiration of the epididymis, but without success. Lespinasse (1947) has advocated the opening of the epididymis so that spermatozoa may flow freely into the tunica vaginalis, but he does not say what success has followed. It does seem very tragic that when live spermatozoa can be demonstrated in the epididymis they cannot be used for insemination. The work of Henle and Zittle (1942) throws some light on the reason for failure.

Comparing the metabolism of epididymial and ejaculate spermatozoa in the bull, they found a remarkable change. Whereas glucose can be oxidised rapidly by epididymial spermatozoa, in the ejaculate there was no oxidation of glucose at all—in fact the addition of glucose depressed oxidation.

Spermatozoa living in germinal epithelium must have energy processes more economical to the substrate. These spermatozoa begin their development with all these complex mechanisms present, which become "hangovers" in ejaculate spermatozoa. Thus the cytochrome (respiratory) system persists in ejaculate spermatozoa, though they do not respire in the ejaculate. It would be much more economical for spermatozoa to use the energy of respiration. The breakdown of glucose to lactic acid to give energy is most wasteful (McLeod 1946); for ten times as much sugar is used to get a unit of energy by that method than by the oxidation of a molecule of glucose.

In this connection the presence of adequate carbohydrate in normal cervical mucus as a natural occurrence is of special significance. The absence of such carbohydrate has been shown (Barton 1948) to be a factor in certain types of infertility.

It would seem that epididymial spermatozoa are not equipped to live in the cervix until they have developed their new method of metabolism—any more than a fœtus removed from the uterus can survive before it has developed an adequate respiratory system through the lungs. The best hope for the future lies in the biochemist providing us with a substrate in which epididymial spermatozoa could live until such time as they have perfected their mechanisms for living like ordinary mature spermatozoa, by the breakdown of glucose to lactic acid.

SUMMARY

A case of sterility with azoöspermia due to congenital atresia of the vas is described. Active spermatogenesis was present in both testes. Vaso-epididymial anastomosis was attempted without success. This condition is more frequent than is generally supposed, and should be sought in all cases of azoöspermia where there is no history of infection.

(*References at foot of next column*)

APLASIA OF THE VASA DEFERENTIA AS A CAUSE OF STERILITY

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IN the routine investigation of 200 cases of male infertility during the last four years bilateral aplasia of the vas deferens was found in 3 otherwise normal men. If careful search were made for the condition, it would probably prove to be a commoner cause of absolute sterility than is suggested by the number of published reports.

Demel (1926) reviewed 12 recorded cases. In 7 the seminal vesicle, ejaculatory duct, kidney, and ureter, as well as part or all of the epididymis and vas deferens on one side had not properly developed. In most of these only the globus major or head of the epididymis was present; in 2 cases the body of the epididymis was also present, and in 1 case only a vestige of the epididymis was found. In all the testes spermatogenic tissue was present and normal. Blecher (1931) also reported 6 cases, and Priesel (1924, 1931) 1 case.

The Nazi habit of sterilising men for various reasons provided a great opportunity for discovering this congenital defect, and Vorstoffel (1937), in a review of the German literature up to 1936, found records of 22 cases of complete or partial absence of the vas deferens; these included 2 cases in which the vas deferens on both sides was a slender fibrous cord, 2 in which the vas deferens and epididymis on both sides were missing, and 2 with normal testes and epididymes but no vas deferens and kidney on one side.

Dirr (1940) reported 2 cases of unilateral absence of the vas deferens in a series of 45 ligations, and stated that the incidence of this anomaly was 0·5% in all operations of this type in Germany. Olesen and Faber (1944) described 2 cases of bilateral aplasia.

Charny (1946), discussing his findings in 308 men subjected to testicular biopsy for impaired fertility, reported 4 cases of congenital absence of the vasa deferentia in patients with azoöspermia and normal spermatogenesis. In an analysis of 146 cases of azoöspermia Michelson (1947) found that clinically there was bilateral absence of the vasa in 4 patients, but that this was confirmed in only 1 case.

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Young (1949) was the first to report a case in this country. He describes the findings in an infertile man, aged 28, with azoöspermia, absence of fructose in the semen, and normal spermatogenesis as shown by testicular biopsy. No abnormality of the vasa was noted clinically, but after careful exploration thin fibrous cords were found on both sides, and no lumen in this tissue was found microscopically. Young discusses the embryology of the genital tract and points out that, if development is disturbed before the 60 mm. stage, it is possible to have a fully developed testis and epididymis with an undeveloped vas deferens, ejaculatory duct, and seminal vesicle. If the epididymis is present, it is unlikely that the vas is ever completely absent; it is more likely to be present in an undeveloped state. If the vas is undeveloped, it is impossible to have a normal seminal vesicle or ejaculatory duct.

Michelson (1949) reported 12 abnormalities of the vas in 900 subfertile men; 11 of these were bilateral. In 8 cases, however, he did not confirm these findings by operative exploration and in 1 of the operated cases only one side was examined. He cites personal communications from R. S. Hotchkiss, who had 20 cases, and F.A. Simmons, who had about 8 with the same incidence.

Kenneth Walker, at the meeting of the Fertility Society this year, drew attention to this anomaly and said he had seen several cases.

PRESENT SERIES

Of the 200 men investigated, 37 (18%) proved to have complete azoöspermia. Bilateral aplasia of the vas was the cause in 3 of these, which is an incidence of 1·5% in the total series and 8% in the patients with azoöspermia. Excluding from the 37 patients 21 who had testicular agenesis, bilateral cryptorchism, tuberculous epididymitis, or atrophy following surgical attempts to bring down undescended testes, we are left with 16 who had testes of normal size on clinical examination, and among these the incidence of bilateral aplasia of the vas deferens was 18%.

CASE-RECORDS

Case 1.—An electrical engineer, aged 39, who had been married for six years without begetting any children, was referred for routine examination. There was no history of venereal disease or injury, and no family history of impaired fertility. His sexual development had been normal, and there were no abnormalities of sexual technique or function; orgasm occurred rather rapidly, with an outwardly normal seminal emission.

On examination the patient was a strong healthy man. His penis and both testes were normal in size and shape, and testicular sensation was present on pressure. The upper poles of the epididymis on both sides felt cystic, but no abnormality of the cord or vas was noted at the time.

Semen.—Two masturbation samples of semen were of small volume, 1 or 2 ml., consisting of abnormally clear mucoid fluid. There was complete azoöspermia after centrifuging, and the fluid only contained a few lipoid granules, probably of prostatic origin.

Biopsy of both testes was carried out under thiopentone anæsthesia, using the punch described by Friedmann (1948), and sections showed that spermatogenesis, although not very vigorous, was active. There was no hyalinisation of the capsules or fibrosis of the interstitial tissue.

Surgical Exploration (A. M.).—The testes were both normal, but the upper pole of the epididymis on both sides was cystic. Puncture of the epididymes with a needle and immediate microscopy revealed plenty of active and apparently normal spermatozoa. There were no bodies or tails to the epididymes, and both vasa were completely absent.

It was hoped to attempt artificial insemination by puncture of the cystic epididymes at the appropriate time in his wife's cycle; but the couple, perhaps wisely, decided to adopt a child.

Case 2.—This patient, a general warehouseman, aged 29, had been married for four years before he decided to be investigated. There was no history of previous illness and no infertility in his family. He had developed sexually at the age of 12 years; masturbation had been normal, as were sexual technique and function.

On examination he was of rather slim build but otherwise healthy. His penis was normal and circumcised. Both testes were equal in size, of good shape, and firm, and normal testicular sensation was elicited on pressure. The upper pole of the epididymis on both sides was enlarged and soft, and the lower pole could not be felt. The vas could not be palpated in the scrotum on the right side, but a normal vas was palpable on the left.

Semen.—Two seminal analyses showed an abnormally clear and slightly milky fluid (volume not recorded). Spermatozoa were absent from both.

Testicular biopsy on both sides was carried out under light thiopentone anæsthesia. On section the tubules of both testes were thin-walled and well filled with active spermatogonia and spermatocytes, many tubules containing numerous adult spermatozoa. The interstitial tissues, particularly on the right side, showed some fibrosis.

Surgical Exploration (A. M.).—On the left side the vas, which appeared normal, was easily traced down to the level of the upper pole of the epididymis where it ended suddenly; there was a tenuous fibrous cord connecting it to the region of the body of the epididymis. The lower pole of the epididymis was absent and only the upper pole and body were identified. On the right side no vas was found in the scrotum, and only the upper pole of the epididymis was present.

Case 3.—A plate-layer, aged 40, had been married for fourteen years, and he and his wife had already adopted one child. As a last hope he presented himself for investigation. There was no history of illness or venereal disease, and his two brothers and three sisters all had large families. Sexual development had occurred normally at the age of 13, and he was fairly sure that as a youth he had produced a reasonable amount of fluid on masturbation. Now, however, although sexual sensation was normal at coitus, orgasm was an odd stinging sensation and he had no feeling of emission. Masturbation had since shown that the emission consisted of a little sticky moisture.

Examination.—He was of slight build and healthy. His penis was circumcised and normal in size. Both testes were large and firm, with cystic upper poles of the epididymes. No vasa could be felt; so bilateral aplasia was diagnosed. The diagnosis was so certain that seminal analysis and testicular biopsy were made on the same day. The former showed only a few drops of whitish fluid. No spermatozoa were seen in the direct smears, and the specimen was insufficient for further examination.

Testicular biopsy showed normal spermatogenesis in the right testis, but on the left side the tubules were distorted and fibrosed, few adult spermatozoa being seen.

Surgical Exploration (A. M.).—There was no sign of a vas on either side between the external abdominal ring and the lower pole of the epididymis, which was slightly larger than normal owing to multiple small cysts, mostly in the upper pole, on both sides.

SUMMARY

Three cases of bilateral aplasia of the vas deferens were found among 200 males investigated for possible infertility; this is an incidence of 1·5%. Further analysis shows an incidence of 8% in cases with azoöspermia, and of 18% in cases with azoöspermia and clinically normal testes.

As a possible cause of sterility, aplasia of the vasa deferentia should be more generally borne in mind.

Our thanks are due to Dr. A. L. Taylor for seminal analyses and for reports on the testicular biopsies, and to the members of the consulting staff of the Bristol Royal Hospital for referring cases.

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LIQUEFACTION OF VISCOUS PURULENT EXUDATES BY DEOXYRIBONUCLEASE

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IN-VITRO experiments and a few clinical observations have been made on reduction in the viscosity of purulent sputa and pleural exudates by the action of the enzyme deoxyribonuclease (D.N-ase) derived from ox pancreas. The enzyme is acting here on extracellular hydrated fibrils of deoxyribonucleoprotein (D.N.P.). The basis of this work is as follows.

Basis of Cellular Nucleic Acids.—In 1868, Miescher isolated deoxyribonucleic acid (D.N.A.) from pus cells. Considerable evidence now indicates the importance of both this substance and ribonucleic acid in all living cells (Brachet 1942, Caspersson 1947, Davidson 1949). Physical and chemical differences exist between the two acids, and solutions of D.N.A. and D.N.P. are much more viscous than those of ribonucleic acid and ribonucleoprotein, probably owing to their highly polymerised macromolecular state (Gulland and Jordan 1947).

Enzymes Degrading Nucleic Acids.—Specific enzymes degrade both acids. D.N-ase is widely distributed—e.g., in rice bran (Serra and Queiroz Lopes 1944), yeast (Zamenhof and Chargaff 1949), and certain hæmolytic streptococci—and is usually obtained pure from beef pancreas by the method of McCarty (1946) or crystalline by that of Kunitz (1950).

When activated by magnesium or certain other ions the enzyme rapidly reduces the viscosity of D.N.A. or D.N.P. solutions, the action being apparently a depolymerisation (Greenstein et al. 1947, Jungner 1950).

D.N-ase action on fixed cells is readily demonstrated cytochemically (Brachet 1942, Sanders 1946, Catcheside and Holmes 1947, Davidson 1947, Brachet and Shaver 1948, White 1950). The nucleases do not, however, act on living cells (Davidson et al. 1948, Ely and Ross 1949), but nucleic acids in extracellular accumulations and in disintegrating cells are readily affected.

Viscosity of Pus, and its Reduction by Streptococcal Enzymes.—Since 1933 Tillett has devoted a great deal of study to the fibrinolytic activity of hæmolytic streptococci. In the course of these investigations Sherry et al. (1948) have shown that in many purulent pleural exudates fibrin may be a less important cause of thickness and viscosity than D.N.P., which may constitute 30–70% of the total solids present. Tillett et al. (1948) have demonstrated further that the D.N.P. may be liquefied by streptodornase, a D.N-ase present in concentrates from cultures of hæmolytic streptococci, particularly of group A. This enzyme is quite distinct from the concomitant streptokinase, a fibrinolysin which liquefies fibrin clots. Dramatic clinical improvement has been described following the injection of such concentrates into the pleural cavity of patients with fibrinous, purulent, and sanguineous pleural exudates (Tillett and Sherry 1949, Sherry et al. 1949), and after "streptococcal enzymatic debridement" of infected surface areas (Tillett et al. 1950, *Lancet* 1950).

Extracellular Fibres of D.N.P.—Fibres seem to be formed readily by the alignment of the D.N.A. or D.N.P. macromolecules. This may well be important in chromosome structure (Astbury and Bell 1938, Mazia et al. 1947, Bateman 1947).

Under various conditions an apparently thixotropic change (gel→sol→gel) leads to the formation of fibres or of rods from whole cell nuclei:

(1) Rod-like nuclear extrusions at the periphery of some cutting-diathermy and aspiration biopsies.

(2) Isolated leukæmic nuclei transformed into cylinders by application of pressure.

(3) A viscous mass of fibres forms when leukæmic lymphocytes are stirred into molar sodium chloride for D.N.P. preparation by the method of Mirsky and Pollister (1946). These finally disperse into solution, and D.N.P. fibres ("chromosin") again precipitate on pouring into 6 volumes of water.

(4) Simple storage of leukæmic cells in their plasma for three weeks at 5°C can yield a viscous mass of D.N.P. fibrils derived from the nuclei.

In all instances a positive Feulgen reaction indicates that the fibres contain D.N.A. Although physical forces operate in examples (1) to (3), in (4) the cells were undisturbed, but autolytic enzymatic changes may have played a part.

VISCOSITY OF SPUTUM AND D.N.P.

Many samples of purulent sputum possess great viscosity and resistance to flow, and on cytochemical examination prove to have a fibrillar structure due to D.N.P. and similar to the examples previously detailed. Movement due to respiration, coughing, and ciliary action may all play a part in forming fibres from leucocyte nuclei, and the result is a mass which is expectorated only with difficulty.

Thorough centrifugation of such sputa produces the classical three layers. Cytochemical examination shows that the topmost layer is clear and viscous, only a few mm. in depth, and contains a minimum of cellular and fibrillary material demonstrable with the Feulgen stain, though a good deal of coagulated protein without D.N.A. is present; the bottom layer is granular, and the Feulgen stain reveals many leucocytes and coarse strands of Feulgen-positive material; and the middle layer, which is by far the most copious, is an extremely viscid mass of vertically oriented fibrils attached to the bottom layer and entangling intact leucocytes. Phase-contrast microscopy also clearly reveals these fibrils both in centrifuged sputum and in fresh unsmeared sputum. This seems to dispose of the possibility that the fibrils are formed as a smear or fixation artefact, though fixation will alter the state of their hydration.

The work presented here is largely concerned with rendering such purulent sputum more liquid by the action of D.N-ase, and with the possibility of administering the enzyme by spray inhalation to patients with chronic bronchitis, bronchiectasis, and similar chest disorders in which tenacity and high viscosity of the purulent material presents difficulty in management.

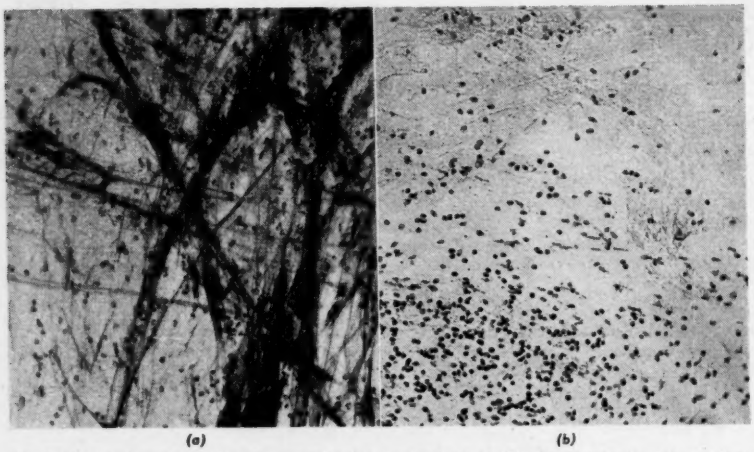
METHODS

Deoxyribonuclease

The enzyme, D.N-ase, was isolated from beef pancreas by the method of McCarty (1946) and freeze-dried. The preparation principally entails repeated fractionation with the aid of ammonium sulphate, and is lengthy but requires little expensive apparatus or reagents. We are, however, grateful to Mr. E. C. Wright, of the Government Research Institute, Weybridge, for freeze-drying our final dialysed solution of purified enzyme. The resulting white solid soluble enzyme was stored in vacuo at 5°C. A yield of about 2·5 g. of dry enzyme was obtained from 10 kg. of pancreas.

Tests for toxicity to rabbits were made by intravenous injection (20 mg. in each of two injections at an interval of ten days) and intratracheally. There were no demonstrable toxic effects, but serum taken ten days after the second intravenous injection gave a precipitin reaction with D.N-ase and inhibited the enzyme activity to a considerable extent cytochemically, suggesting the development of an antibody. The specificity of these reactions is now being investigated.

Stock solutions of the enzyme were made, up at a concentration of 0·05 mg. per ml. or more, in *M*/50 $MgCl_2$ solution containing 1% gelatin. The magnesium



(a) (b)

Fig. 1—Photomicrographs of sputum wet-fixed in Susa solution and Feulgen-stained: (a) purulent sputum showing Feulgen-positive fibrils arranged in strands and entangling leucocytes; (b) non-purulent mucinous sputum showing Feulgen reaction confined to nuclei of leucocytes, which are embedded in muco-protein (× 100).

ion is an obligatory activator, and the gelatin protects the unstable enzyme in solution. The fresh solution was sterilised by Seitz-filtering, dispensed in 5 ml. bottles, and stored at 5°C. Full bacteriological tests for sterility were made through the kindness of Dr. W. Hayes and Dr. G. I. M. Ross.

Cytochemical Tests

For investigating the action of the enzyme we have used a technique previously found reliable in the study of cellular nucleoproteins (White 1947, 1950). D.N-ase activity was very high, and proteolytic activity not appreciable at enzyme concentrations up to 0·2 mg. per ml., though slight proteolysis occurred at higher concentrations. No appreciable fibrinolytic activity was shown at a final concentration of 0·5 mg. per ml.; only slight softening of the fibrin clot, without any liquefaction, occurred after eighteen hours at 37°C.

The sputum samples were smeared on to glass slides and fixed while wet in Susa solution for an hour. Wet preparations of blood-cells or other test preparations were fixed in the same way. In the in-vitro experiments the slides were covered with test enzyme solution or control solution minus enzyme, and kept at room-temperature, or at 37°C, for an hour or more. Next they were washed and stained by the pyronin-methyl green or Feulgen methods. The latter is generally considered a highly specific cytochemical test for D.N.A. (Feulgen and Rossenbeck 1924), and the former method gives a useful and reliable distinction between the two forms of nucleic acid (Brachet 1942).

In the Feulgen preparations of purulent sputa long fibrils of Feulgen-positive material are to be seen running between the leucocytes and enmeshing them. In comparative studies changes in the number and structure of these fibrils are readily appreciated on high-power microscopy.

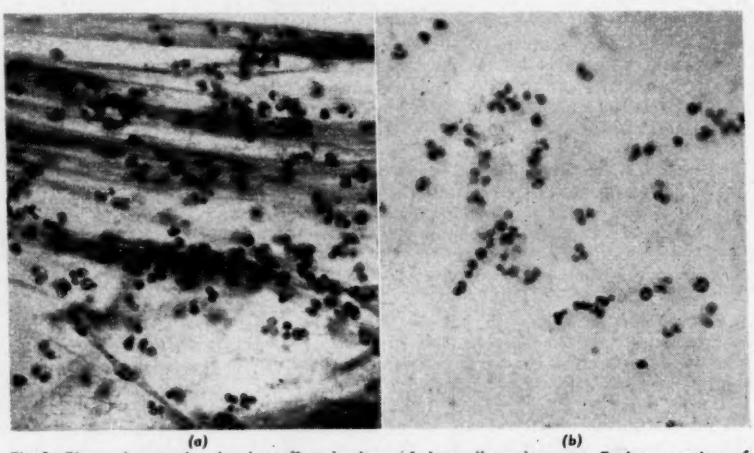
Viscosity Measurements

It is evident that the presence of fibrils confers a structural rigidity rather than a true solution viscosity on the sputum, rendering straightforward viscometry very difficult.

Comparative measurements of the viscosity of the sputum samples were estimated on a modification of the ball viscosimeter described by Lucas and Henderson (1936), using 9·5 cm. of a tube of bore 6 mm., and a ball-bearing of 3 mm. diameter (weight 2·0 g.) or 0·25 ml. of mercury (weight 3·4 g.). As Lucas and Henderson found with saliva, the viscosity of sputum decreases with time after collection, rapidly at body-temperature but appreciably at 5°C. The decrease is presumably due to enzyme activity within the sample, and this made serial studies on fresh material from patients practically impossible. One spasm of coughing seldom produced sufficient for making estimations with the equipment described. But controlled in-vitro studies or mixed samples of relatively fresh sputum enabled significant differences to be detected.

Inhalation Spray

The D.N-ase was made up in various strengths —0·05 mg. and 0·5 mg. per ml.—in *M*/50 $MgCl_2$ with 1% gelatin, Seitz-filtered, and stored in 5 ml. quantities at 5°C till used. The lowest concentration was found too low for consistent clinical results, though a cytochemical effect was obtained. The efficacy of the spray was demonstrated beforehand on fixed smears of cells. The higher concentrations proved more satisfactory clinically. The spraying apparatus was the commercially available 'Deedon,' modified to give a flow of vapour, through a 3-in. glass tube of about 1 in. diameter, directly into the mouth. A flow of 6–8 litres a minute of 5% carbon dioxide and 95% oxygen was supplied through a T-tube. The other wing of the T was closed by the patient's thumb during inspiration and open during expiration, in the manner described by Barach (1945). In the



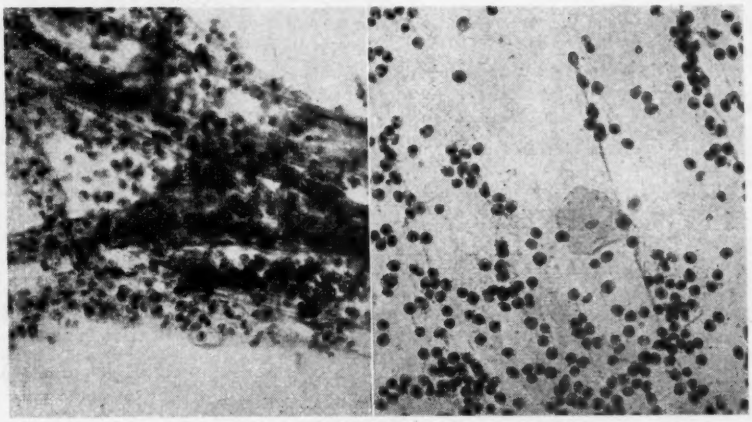
(a) (b)

Fig. 2—Photomicrographs showing effect in-vitro of deoxyribonuclease on Feulgen reaction of purulent sputum: (a) control sample after two hours' incubation at 37°C, showing many Feulgen-positive fibrils and leucocytes; (b) sample of same sputum after action of deoxyribonuclease, showing disappearance of Feulgen-positive fibrils but persistence of intact cell nuclei (× 400).

clinical trials the inhalation spray was administered once only or three times a day for two or more days, to a maximum of eleven inhalations for any one patient in this study. There was no contra-indication to longer administration. The enzyme was not inhibited by penicillin or streptomycin, in either the test-tube experiments or the therapeutic spray, as demonstrated cytochemically.

RESULTS

Material from 15 patients has been studied. In 8 patients the sputum was studied by in-vitro experiments using the enzyme D.N-ase and suitable control solutions. Clinical appraisal of the enzyme effect was attempted in 7 patients, D.N-ase being administered by inhalation spray to 6, and by intrapleural injection to 1.



(a) (b)

Fig. 3—Photomicrographs of Feulgen-stained sputum from a patient with bronchiectasis: (a) control specimen expectorated before inhalation of enzyme, showing leucocytes entangled in thick ropes of Feulgen-positive fibrils; (b) sputum expectorated the day after inhalation spray of deoxyribonuclease 5 mg., showing disintegration and disappearance of Feulgen-positive fibrils, with persistence of many free leucocytes (× 200).

In Vitro

Fig. 1 compares the appearance of purulent sputum (*a*) with mucinous non-purulent sputum (*b*). Fibrils are seen as ropes and strands which give a positive reaction to the Feulgen stain in the purulent specimen. Feulgen-positive fibrils are not seen in the non-purulent specimen, though the cell nuclei, containing D.N.P. are stained, and the cells are embedded in mucoprotein. The effect of the enzyme D.N-ase on the fibrils after incubation for two hours at 37°C is shown in fig. 2, and compared with a control sample. In the enzyme-treated specimen the Feulgen-positive reaction of the fibrils has almost entirely disappeared, but the nuclei of many intact leucocytes have preserved their staining characteristics. After incubation for two hours at 37°C the viscosity of the enzyme-treated sputum was reduced to 27% of the control.

In Vivo

Similar though not such extensive alterations in the fibrils were seen in the sputum samples obtained from 4 patients with purulent bronchitis, at suitable intervals after a single inhalation of 5 ml. of the D.N-ase solution. The lowest concentration (0·05 mg. per ml.) of enzyme was used first and found to have little clinical effect, although there was demonstrable cytochemical change in the subsequent sputum. The first change seen was a diffuseness and then slight granularity in the Feulgen-stained fibrils. Later the fibrils became fragmented, stained more weakly, and finally disappeared. In case 1 there were typical in-vivo macroscopical and microscopical changes in the sputa after a single inhalation of D.N-ase. Case 2 was a patient with empyema who was given two intrapleural injections of 0·25 mg. of D.N-ase at an interval of forty-eight hours.

Case 1.—A man, aged 75, had worked as a miner until five years ago. He had had fair health, except for a chronic cough and grey sputum for years. A month before admission cough and sputum had become much worse, and associated with dyspnœa.

Date	*Clinical data and therapy*	*Cytochemical findings in sputum*
Feb. 6	Admitted with acute urinary retention. Chest: rhonchi throughout, râles at both bases posteriorly	—
Feb. 14	Coughing up greenish purulent sputum 8–10 oz. daily	—
12.30 P.M.	Vital capacity 800 ml. D.N-ase 0·25 mg. by inhalation spray	*Control (before therapy)* 8 A.M. to 12.30 P.M.; a great many fine Feulgen-positive fibrils
1.30 P.M.	Sputum slightly less viscid, no subjective change	Little change, though some fibrils less discreet and Feulgen-negative ground substance more evident
3.30 P.M.	Sputum: little change	Few Feulgen-positive fibrils, and these less discreet. Feulgen-negative ground substance increased and free cells more evident
Feb. 15 8.45 A.M.	Sputum easier to bring up during the night, no visible change in character	Fibrils diffuse and weakly Feulgen-positive; background more cellular
4.45 P.M.	Respiration easier, sputum readily brought up	Fibrils fragmented, granular, and practically all Feulgen-negative
Feb. 16 8.30 A.M.	Feels about same, no further change in sputum	Short irregular fibrils reappearing but not deeply Feulgen-positive
Feb. 17 9.00 A.M.	Sputum more viscid but not to control levels, vital capacity 1250 ml.	Fibrils longer but not aligned in strands; little ground substance

Case 2.—A woman, aged 56, with two weeks' history of severe malaise, weakness, sweating, cough with little sputum, and pain in the left side of the chest.

Date	*Clinical data and therapy*	*Cytochemical findings in pleural exudate*
Jan. 20	Admitted flushed and exhausted, with dullness at left base; radiography showed diffuse shadow in same area Penicillin I.M. 500,000 units daily until Jan. 24, 'Aureomycin' Jan.24–28	—
Jan. 30	Chest aspiration: 60 ml. of thick tenacious greenish pus, giving lactose-fermenting coliform bacillus in culture Penicillin 500,000 units injected intrapleurally	Fine thin strands of Feulgen-positive material between deeply stained nuclei of enmeshed cells
Jan. 31	Chest aspiration: 155 ml. of thick ropy greenish exudate, difficult to aspirate D.N-ase 0·25 mg. in 10 ml. of saline solution injected intrapleurally with penicillin 1,000,000 units	Appearances similar to above, but Feulgen-negative ground substance slightly increased
Feb. 1	Chest aspiration: 140 ml. of moderately thick smooth pus, running more readily through the needle	Pus-cell nuclei still stain Feulgen-positively; fibrils thicker, more diffuse, and many fragmented
Feb. 2	Chest aspiration: 120 ml. of free-flowing greenish exudate, giving profuse growth of *Bact. coli* on culture D.N-ase 0·25 mg. in 10 ml. of saline solution and penicillin 1,000,000 units injected intrapleurally	Fibrils infrequent, thin, and discreet; ground substance much more diffuse and cells relatively more numerous

Feb. 4.	Chest aspiration: 170 ml. of watery green fluid. Penicillin 1,000,000 units injected intrapleurally	Cells still in strands, but fibrils granular, thick, and diffuse
Feb. 6.	Chest aspiration: 150 ml. of watery green fluid	Strands very diffuse; no fibrils; cells degenerating
Feb. 7.	Chest aspiration: 30 ml. of watery green fluid	A few fibrils; less ground substance; cells more numerous
Feb. 10.	Operation: rib resected, and fluid purulent exudate removed; visceral pleura unusually thin	

Subsequent clinical studies were made on two young bronchiectatic patients, the enzyme being used in a concentration of 0·5 mg. per ml. and a dosage of 10 ml. a day (5·0 mg. of D.N-ase a day) divided into three doses. In one case given full dosage from the start there was subjective improvement; the patient said he could walk up two flights of stairs, without stopping, for the first time in the last three years of his thirteen years of bronchiectasis. He also stated that he slept better, breathed more easily on awakening, and brought up his sputum more readily, and that his chest felt lighter. This improvement took place coincidentally with the administration of the enzyme, whereas 100,000 units of penicillin had been given by the same route daily for nine days without producing any improvement and had been stopped five days before the exhibition of the enzyme. The quantity of sputum expectorated increased the day after the first enzyme inhalation, and then decreased. Cytochemical changes were evident the day after the first inhalation and are shown in fig. 3. They were still present during the subsequent week, though gradual return of thick strands was evident by the sixth day after the last inhalation. Similar cytochemical changes were observed in the second bronchiectatic patient, who was started on the lower dosage and showed less clinical effect.

Endotracheal injection by the oral catheter technique (as used for lipiodol) was done on two occasions, with the coöperation of Dr. D. G. James, but without demonstrable beneficial effect.

None of the patients to whom D.N-ase was given by any of several routes showed symptoms of toxicity, and no febrile reactions occurred. The bacterial flora cultured from the purulent sputa were all organisms commonly inhabiting the upper respiratory tract, with predominance of *Strep. viridans*; in one case only was a group-A hæmolytic streptococcus found.

DISCUSSION

The findings of Sherry et al. (1948, 1949) and Tillett et al. (1948, 1949, 1950) on the importance of D.N.P. in viscid purulent materials, and the action of D.N-ase on these, are substantiated. A few in-vivo studies suggest a rapid action and a long-lasting effect of ox-pancreas D.N-ase on purulent material within the human chest. The administration of the enzyme by inhalation spray may prove a useful adjunct to antibiotic therapy of acute and particularly of chronic bronchial inflammatory diseases that are so prevalent in this country. D.N-ase might prove also to be of some value in other purulent conditions, such as chronic sinusitis, otitis media, cystitis, and so forth, though we have not explored these possibilities.

The enzyme, which is specific in attacking only D.N.A., seems to be antigenic in the rabbit, but no sensitivity reactions were observed in patients in whom there were intervals of from four days to a month between courses of inhalation of the D.N-ase. This enzyme has no effect on true mucinous sputum, such as commonly arises in asthmatic patients. The preparation had no more than a trace of residual proteolytic or fibrinolytic activity.

SUMMARY

Some of the cytochemical characteristics of viscous purulent sputum are described, deoxyribonucleoprotein fibrils being an important constituent.

Treatment of such sputum with deoxyribonuclease, an enzyme isolated from ox pancreas, reduced the number of these fibrils and made the sputum less viscous.

A method of spray inhalation of this enzyme is described for patients with chronic chest infection. Clinical benefit was obtained with repeated inhalations containing 5 mg. of deoxyribonuclease a day.

No toxic or anaphylactic reaction was encountered in the clinical studies.

We are indebted to Prof. J. McMichael, Dr. J. G. Scadding, and other colleagues for permission to study their patients; Prof. J. H. Dible and Prof. J. N. Davidson for advice and criticism; Mr. L. H. Turnbull for technical help with the Feulgen staining; and Mr. K. G. Moreman, A.R.P.S., for the photomicrographs.

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HISTOLOGY OF THE ENDOMETRIUM IN "ORGANIC UTERINE HÆMORRHAGE"

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IN recent years there have been many publications on functional uterine hæmorrhage, or dysfunctional uterine hæmorrhage, as it is sometimes called. These terms are usually applied to cases of abnormal uterine bleeding which is not explained by any palpable lesion of the reproductive organs. Smith (1944) regards the use of the word "functional" as an admission of ignorance of the true cause of the bleeding.

I have already reviewed the recent literature of this subject (Sutherland 1949b) and have considered in some detail the histology of the endometrium in functional bleeding (Sutherland 1949a). I analysed the histological findings in the endometrium in 1000 cases of abnormal uterine bleeding in the absence of gross pelvic disease, all types of abortion and all patients with bleeding after the menopause being excluded. The results, arranged

according to age, are set out in table I, which shows that organic pathological conditions of the endometrium were found in 139 cases.

Though most workers restrict the use of the term "functional uterine hæmorrhage" to cases of abnormal bleeding in the absence of any palpable lesion of the reproductive organs, it is occasionally used in a different sense. Béclère (1934, 1938a, b, and c) and Huffman (1942) speak of functional bleeding due to genital infection. Brewer and Jones (1948) say that hæmorrhage can occur irrespective of the presence or absence of gross pelvic disease, and that the ovarian and endometrial changes are the same in either case.

PRESENT SERIES

To investigate further the above-mentioned statement of Brewer and Jones (1948) in so far as the endometrial histology is concerned, an analysis was made of the clinical and histological findings in 1000 cases of abnormal uterine bleeding in the presence of palpable disease of the pelvic organs which might explain it. These patients were treated in the Royal Samaritan Hospital for Women between Oct. 1, 1937, and April 19, 1949. It was impossible to obtain an absolutely consecutive series of cases, because in a few instances the clinical records were incomplete or missing. The information available was insufficient to enable an assessment to be made of the part played by such general conditions as blood dyscrasia in causing the bleeding in these patients. The following cases were specifically excluded from the series: all types of abortion; all cases in which the only pelvic abnormality present was slight symmetrical uterine enlargement or slight cystic enlargement of one ovary; and all cases of bleeding after the menopause.

Organic pelvic lesions were present in every case, the diagnosis being confirmed histologically in most of them. The details were as follows:

Lesion	*No. of cases*
Uterine fibroids, irrespective of size and position	830
Chronic salpingitis or salpingo-oöphoritis	141
Adenomyosis of uterus	35
Chronic parametritis, mainly of slight degree	27
Endometrioma of one or both ovaries	26
Ovarian neoplasms of various types	19

HISTOLOGICAL MATERIAL

The material available for histological examination consisted of the uterus in 628 cases, and of curettings in the remaining 372. No attempt was made in any instance to obtain endometrium at any particular time in the menstrual cycle, the patients being admitted to the hospital from the waiting-list in the usual way and undergoing operation as soon as possible after admission. Though more information might have been obtained if it had been possible to choose the time of securing specimens, it will be shown that, even in such a series, routine histological examination of the endometrium is desirable, irrespective of age.

HISTOLOGICAL FINDINGS

The details of the endometrial histology, arranged according to age, are shown in table II. For purposes of comparison each category in tables I and II will be discussed in turn, the cases in table I being referred to as the "functional" group, and the cases in table II as the "organic." In comparing these series it should be noted that table I deals with an age-group more than fifteen years younger than that in table II, and it is likely that this factor plays some part in the differences between the two. It would also have been interesting to have a control series of the endometrial findings in healthy women without abnormal uterine bleeding, but this proved impracticable.

Chronic Endometritis

In the "organic" cases chronic endometritis was found 40 times (4%), compared with 110 cases (11%) in the "functional" series. The endometritis was invariably interstitial and was diagnosed only when the endometrial stroma showed appreciable infiltration with lymphocytes and plasma cells. Of the 40 patients 15 gave no history of pregnancy. The following histological pictures were seen:

TABLE I—ENDOMETRIAL HISTOLOGY IN 1000 CASES OF ABNORMAL UTERINE BLEEDING IN THE ABSENCE OF GROSS PELVIC DISEASE

Age (years)	No. of cases	Chronic endometritis	Uterine polypi	Tuberculosis	Malignant disease	Hyperplasia	Atrophy	Irregular shedding	Irregular ripening	No apparent abnormality
20 or less	36	2	0	1	0	9	0	0	0	24
21–30 ..	242	40	3	5	0	22	0	1	6	165
31–40 ..	343	41	4	1	2	82	3	3	10	197
41–50 ..	362	27	2	3	5	145	5	9	10	156
Over 50..	17	0	2	0	1	7	2	0	0	5
Total ..	1000	110	11	10	8	265	10	13	26	547

	No. of cases
Endometrium in proliferative phase of cycle	23
Endometrium in secretory phase of cycle	6
Ehdometrial hyperplasia	7
Irregular ripening of endometrium	3
Endometrial atrophy	1

The relatively high incidence of chronic endometritis in the "functional" cases is of interest. In view of the fact that chronic salpingitis or salpingo-oöphoritis occurred in 141 of the "organic" cases and chronic parametritis in 27, one might reasonably expect a high incidence of endometritis in these conditions. In the 40 cases under review chronic adnexal infection occurred 17 times and chronic parametritis once.

Uterine Polypi

Uterine polypi were discovered in 18 cases in the "organic" group (1·8%). In 16 instances the polypi were of the mucous endometrial type, and in the remaining cases fibroid polypi were found. Uterine fibroids were present in all 18 cases. This figure of 1·8% does not differ significantly from that of 1·1% found in the "functional" series.

Endometrial Tuberculosis

In a previous communication (Sutherland 1943) unsuspected tuberculosis of the endometrium is discussed in detail and the published reports on tuberculosis of the uterus are reviewed. Of 58 cases of uterine tuberculosis 34 were apparently limited to the uterine body and showed no evidence of involvement of other pelvic structures on clinical examination. In 9 of these 34 cases the principal complaint was profuse and sometimes irregular bleeding. The occurrence of endometrial tuberculosis on 9 occasions in the "organic" series (0·9%) is essentially similar to that found in the "functional" group (1·0%). Of the 9 patients 8 were nulliparous, and the 9th had had a miscarriage. Adnexal thickening was noted in 6 of the 9 cases.

TABLE II—ENDOMETRIAL HISTOLOGY IN 1000 CASES OF ABNORMAL UTERINE BLEEDING IN THE PRESENCE OF GROSS PELVIC DISEASE

Age (years)	No. of cases	Chronic endometritis	Uterine polypi	Tuberculosis	Malignant disease	Hyperplasia	Atrophy	Irregular shedding	Irregular ripening	No apparent abnormality
20 or less	7	2	0	2	0	1	0	0	0	2
21–30..	75	11	0	1	0	7	1	0	0	55
31–40..	306	14	6	4	5	36	12	0	6	223
41–50..	529	11	9	2	12	124	33	0	8	330
Over 50	83	2	3	0	6	27	3	0	4	38
Total..	1000	40	18	9	23	195	49	0	18	648

Malignant Disease of Uterus

There were 23 cases of malignant disease of the uterus in the "organic" series (2·3%) as compared with 8 examples in the "functional" group (0·8%). Possibly the rather higher incidence in the "organic" series is due, in part at least, to the larger numbers of patients in the later age-groups in that series. As would be expected, all 23 patients were in the higher age-groups, the youngest being aged thirty-two. Carcinoma of the uterine body occurred in 19 cases, including the patient aged thirty-two, and sarcoma was found in the remainder. Uterine fibroids were present in all 23 cases, and 1, in addition, had bilateral ovarian carcinoma. These figures indicate the desirability of histological examination of the endometrium in all cases of fibroids with abnormal uterine bleeding; of 830 patients with fibroids in the present series 23 had malignant disease of the endometrium (2·8%). According to Novak (1947) the presence of fibroids may possibly predispose to the development of adenocarcinoma of the uterine body. Kelly and Cullen (1909) found 25 examples of adenocarcinoma in "over 1400 cases of myomatous uteri." McDonald (cited by Novak 1947) found 20 cases of adenocarcinoma in 700 cases of myoma, and similar figures are reported by Stewart (cited by Novak 1947). These findings are in reasonable agreement with those in the present group of cases.

Endometrial Hyperplasia

The extensive literature on cystic glandular hyperplasia of the endometrium has already been reviewed (Sutherland 1949a), and it has been pointed out that great differences of opinion exist about the incidence of this condition, and that these differences may, to some extent, be due to different conceptions of what constitutes endometrial hyperplasia. In the present cases endometrial hyperplasia was found on 195 occasions (19·5%), as compared with 265 in the "functional" series (26·5%). Among these 195 cases uterine fibroids were found in 168, chronic pelvic infection in 19, adenomyoma of uterus in 10, endometrioma of ovary in 3, and ovarian neoplasm in 3.

Endometrial Atrophy

A study of the literature of endometrial atrophy in relation to functional uterine bleeding (Sutherland 1949a) shows that opinions differ widely on this condition. In the present cases the term is applied only where the endometrium was thin and scanty, with infrequent inactive glands, or where the amount of tissue was so small as to make accurate description impossible. The incidence of atrophy in the "organic" cases was 4·9%, as compared with 1% in the "functional" group. In these 49 cases uterine fibroids were present in 44 instances, adnexal infection in 4, ovarian neoplasm in 2, adenomyoma of uterus in 1, and endometrioma of ovary in 1. Most of these cases occured in the later age-groups. The appreciably higher incidence of atrophy in the "organic" group may be due to the association with uterine fibroids in most cases.

Irregular Shedding of Endometrium

The literature of this condition is discussed in an earlier communication (Sutherland 1949a). According to Holmstrom and McLennan (1947) the phrase "irregular shedding of the endometrium" is used to indicate a specific type of functional uterine bleeding which is characterised by prolongation of cyclic menstrual bleeding from progestational endometrium and often, in addition, by an increase in the amount of bleeding. The diagnosis is suggested by the typical clinical history of regularly recurring menorrhagia and is substantiated if secretory endometrium is obtained by curettage during the long-continued bleeding, well beyond the time when endometrial regeneration would normally have occurred. They state that, for diagnosis, the patient must be curetted on the fifth or sixth day of the menstrual period, since endometrium obtained on the first day of the period in a normal woman will show many of the characteristics of irregular shedding.

In the "functional cases" irregular shedding was found on 13 occasions (1·3%). Probably, however, the true incidence of irregular shedding in such cases is appreciably higher, since relatively few of these patients were curetted during a spell of bleeding. The figures from the literature (Sutherland 1949a) support this suggestion. In the "organic" cases no examples of irregular shedding were found, but it is impossible to draw any conclusions about the incidence of this condition in view of the fact that these patients were very rarely operated on during the bleeding.

Irregular Ripening of Endometrium

This condition has a relatively scanty literature (Sutherland 1949a). It represents a mixture of the proliferative and secretory phases of the menstrual cycle. On histological examination the peripheral zone of the endometrium shows considerable areas which are definitely non-secretory and others which are definitely secretory in appearance. In some cases the non-secretory elements predominate, and in others the distribution is more patchy. To make such a diagnosis histologically, these changes must be observed in the functional layer of the endometrium, and a considerable number of glands must be involved.

In the "organic" cases irregular ripening was found on 18 occasions (1·8%). This figure is in reasonable agreement with that of 2·6% in the "functional" series. In these 18 cases fibroids were present in 13, chronic pelvic infection in 5, and adenomyoma in 1. Possibly a higher figure might have been obtained if routine examination of the endometrium in the premenstrual phase of the cycle had been carried out.

Normal Endometrium

The endometrium did not show any histological abnormality in 648 of the "organic" group (64·8%), as compared with 547 in the "functional" cases (54·7%). Secretory changes were seen in 253 of the "organic" series and 263 of the "functional" group. The remaining specimens in each category were in the proliferative phase of the cycle. Probably a higher incidence of secretory endometria would have been found in either group if it had been feasible to obtain endometrium towards the end of the cycle in every case. From the information available it is impossible to estimate the number of patients with anovulatory bleeding in these groups.

CONCLUSIONS FROM HISTOLOGICAL FINDINGS

Evidence has been put forward to show that it is desirable to examine the endometrium histologically in all cases of abnormal uterine bleeding even if there is some pelvic disease which might explain the bleeding. By doing so unsuspected organic conditions of the endometrium can be discovered. The histological findings described here show that the endometrial patterns in "organic uterine bleeding" are essentially similar to those in "functional" cases, the only striking difference being in the incidence of chronic endometritis. It is impossible to say how often the associated gross pelvic disease is responsible for the abnormal bleeding in such cases. Though the bleeding often ceases after the presumed causal condition has been removed, many patients with fibroids, salpingo-oöphoritis, and other gross pelvic lesions have normal menstrual cycles. The figures given here suggest that too much emphasis may previously have been laid on the importance of the endometrial histological appearance in functional uterine hæmorrhage.

SUMMARY

An analysis was made of the histological findings in the endometrium in 1000 cases of abnormal uterine bleeding in the presence of gross pelvic disease which might explain it. All patients with postmenopausal bleeding and all types of abortion were excluded.

In 90 cases organic pathological lesions of the endometrium were found. Chronic endometritis occurred in 40 cases, uterine polypi in 18, tuberculosis in 9, malignant disease in 23. In the remaining 910 cases no organic pathological conditions of the endometrium were found. Endometrial hyperplasia occurred 195 times, endometrial atrophy 49 times, and irregular ripening of the endometrium 18 times. The remaining 648 specimens appeared normal.

These findings, considered in conjunction with those of a previous series of 1000 cases in which there was abnormal uterine bleeding but no gross pelvic disease, demonstrate the necessity for routine histological examination of the endometrium in *all* cases of abnormal uterine bleeding, whatever the patient's age.

I wish to thank Prof. T. Ferguson for his helpful criticism and advice regarding the statistical aspect of this paper, and Drs. D. McIntyre, J. Hewitt, and W. Clement for permission to study case-records from their files.

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Preliminary Communication

BACTERIAL POLYSACCHARIDES IN THE DIAGNOSIS OF INFECTIONS

THE POLYSACCHARIDE LYSIS TEST

A NEW field in laboratory technique has been opened by the demonstration of Middlebrook and Dubos (1948) that adsorption of a heat-stable polysaccharide fraction of *Mycobacterium tuberculosis* H37Rv on sheep erythrocytes renders them specifically agglutinable by sera from immunised animals or from patients with active tuberculosis. Scott and Smith (1950) showed that equivalent results could be obtained with Old Tuberculin as the sensitising agent, but the use of a hæmagglutinating system inevitably leads to anomalous results from the occasional presence of heterophil antibodies. Keogh et al. (1948) and Fisher and Keogh (1950) showed that the addition of complement to the reacting system caused specific hæmolysis. This reaction, which we call the polysaccharide lysis test (P.L.T.), seemed to us to be applicable to various infections, and we have prepared satisfactory active fractions from the salmonellæ (modifying the Widal reaction), from *Proteus* (modifying the Weil-Felix reaction), *Neisseria gonorrhœæ* (superseding the gonococcal complement-fixation test), and *Myco. tuberculosis*. The use of *S. typhi* O polysaccharide in the diagnosis of typhoid fever is described elsewhere by Thomas and Mennie (1950), and the use of *Proteus X* K OXK polysaccharide in the diagnosis of scrub-typhus has been described by O'Connor and MacDonald (1950). We are here briefly reporting our results to date, with particular reference to tuberculosis and gonorrhœa; full details will be published elsewhere.

METHODS

The selection of sheep cells for the reacting system is arbitrary and conditioned by their availability and ease of storage in 5% sodium citrate (Evans 1950). Preliminary absorption of the test serum (30 minutes at room-temperature) is necessary to remove heterophil antibodies, but this has not proved an obstacle in practice. Theoretically, Forssman-deficient rabbit cells are the ideal. Experiments with *S. typhi* polysaccharide showed no differences in titre between sensitised human group O cde/cde, sheep, rabbit, chicken, or guineapig erythrocytes.

Inactivated sera, after absorption with untreated sheep cells, are set up in serial doubling dilutions of 0·25 ml. unit volume in $3 \times 1/2$ in. tubes. To each is added 1 vol. of sensitised cell suspension and 2 vol. of complement containing 1 Kolmer unit. Appropriate controls (serum + untreated cells; sensitised cells + complement; sensitised cells + saline; known positive and negative sera in full) are set up and the whole incubated for 1 hr. at 37°C. The end-point is taken as the highest dilution showing sparkling hæmolysis (titres given are reciprocals of the original and not the true final serum dilution).

Sensitised cells are prepared by treating packed washed sheep cells with 10 vol. of 0·1% polysaccharide in saline solution for 2 hr. at 37°C, washing three times with saline, and resuspending to 0·5% concentration in saline solution. With the defined reacting system no differences were noted between 0·5, 1, and 2% suspensions; the first was selected as conserving polysaccharide. Sensitised cells seem to be more stable than untreated cells, suspensions remaining potent and unhæmolysed for a week or more at 20°C. The 0·1% polysaccharide concentration is arbitrary, but that of *N. gonorrhœæ* requires to be of this order; *S. typhi* O polysaccharide is active in dilutions of 1×10^{-5}. Cells sensitised with gonococcal polysaccharide show a relatively rapid loss of sensitivity and, when tested against the same serum, may show a fourfold to eightfold reduction of titre in 3 or 4 days. Per contra this may be due to instability of the natural antibody, and the point, being of practical importance, required further investigation.

We have prepared serologically active polysaccharide fractions by the following methods:

I. Rapid freezing (dry ice-alcohol) and thawing (56°C) twenty times.

II. Papain digestion for 6 hr. at 52°C at pH 6 of fresh suspensions from solid media or of acetone-dried bacterial bodies (Freeman et al. 1940) followed by neutralisation with *N*/10 NaOH.

III. Treatment of similar suspensions with the lytic product of *Streptomyces albus* (Maxted 1948).

These methods yield a polysaccharide-containing supernatant fluid which may be used directly for sensitisation.

IV. Precipitation of the F68 polysaccharide by 68% *v/v* ethanol from ice-cold trichloro-acetic acid extracts of acetone-dried bacterial bodies (Boivin et al. 1933); the product is purified by dialysis and dried in vacuo from acetone.

V. Ethanol precipitation from an alkaline hydroylsate (*N*/4 NaOH) of large volume (10 litres) 10-day broth cultures (Ashenburg et al. 1950). The crude precipitate is purified from solution in 0·1*M* sodium acetate/acetic-acid buffer (pH 4·8) by repeated extractions with a chloroform-*n*-butanol mixture, reprecipitated with 1·5 vol. of ethanol and dried in vacuo from acetone.

Both these methods yield a pure dry polysaccharide which can be used quantitatively. Method V gave maximal yields and seems to be that of choice for large-scale production.

VI. Alkaline hydrolysis (*N*/4 NaOH) for 6 hr. at 56°C of a heavy suspension or dense fluid culture and precipitation with 68% *v/v* ethanol. The polysaccharide is allowed to precipitate overnight at 2°C, collected by centrifugation, and either acetone-dried for storage or used directly.

A single experiment of note was the preparation of the pure FX flagellar antigen *d* of *S. typhi* from the cells of a

formolised broth culture (250 ml.) by extraction with 10% diethylene dioxide and precipitation as a filmy cloud by half-saturation with $(NH_4)_2SO_4$ (Jenkins 1946). The precipitate taken up in saline solution gave a precipitin reaction to titre with *S. typhi* H serum and a P.L.T. to titre with the same serum when adsorbed on to sheep cells. The interest lies in the fact that the antigen is a pure protein.

TUBERCULOSIS

The observations of Middlebrook and Dubos (1948) have been confirmed by the P.L.T. in tuberculosis with a tuberculo-polysaccharide prepared from Old Tuberculin (supplied by Messrs. Burroughs Wellcome & Co.) by dialysis against running water for 18 hr. followed by frequent changes of distilled water for 18 hr. The dialysate was concentrated to a quarter of its original volume in vacuo and adjusted to pH 7·2 before use as a direct sensitising agent. Further work on the extraction of active fractions from both the bacterial bodies and the substrate of fluid cultures of the H37Rv strain is in progress.

A preliminary series of 50 sera from persons with no history of either tuberculous or gonococcal infection gave uniformly negative results. A similar series was then provided by Dr. A. M. Beemer, of King George V and Springfield Hospitals for Tuberculosis, Durban, from patients with both positive and negative sputum tests. In every case of active disease the P.L.T. was positive, the titres ranging from 6 to 64. The results in negative-sputum cases were variable, and the clinical assessment of the test and the relations between the P.L.T. titre and the stage of activity of the disease have yet to be determined; this will depend on the large-scale production of the polysaccharide. Moreover the multiple polysaccharide complexes of the tubercle bacillus require further investigation; the isolation of serologically active but distinct fractions from the human and bovine strains which could be adapted to this technique would represent a distinct diagnostic advance.

The specific neutralising action of the tuberculo-polysaccharide was demonstrated by fixing equal volumes of dialysed tuberculin and positive serum for 1 hr. at 37°C. Hæmolysis did not take place on the subsequent addition of sensitised cells and complement.

GONORRHŒA

Serologically active fractions were obtained from *N. gonorrhœa* by methods I, II, and VI, first from a pooled batch of time-expired gonococcal vaccine, and subsequently from the parent vaccine strains Rietfontein 1 and 4, supplied by Dr. D. Ordman, of the South African Institute for Medical Research, and from a local strain, w190. The vaccine yield was adequate but low; partial extraction and degradation of the polysaccharide had taken place during 28 months' storage in 0·5% phenol, as shown by the fact that an inactive polysaccharide fraction could be precipitated from the supernatant fluid. Since at least two serological strains exist, determined by specific polysaccharides (Casper 1937), it is desirable, for practical purposes, to use mixed strains for preparing active extracts. Any solid medium supporting prolific growth is suitable; we have used dextrose-starch-agar and are now investigating a supplemented papain-digest broth (modified from Le Minor 1948) for large-scale production by method V.

Our purpose was to investigate the possibility of substituting the P.L.T. for the gonococcal complement-fixation test, which presents a number of difficulties apart from that of interpretation, chief among which are the low titres to which antibodies are demonstrable in serum, the relative instability of the antigen, and the frequency of anticomplementary reactions. A preliminary series of controls (same sera as for tubercle P.L.T.) gave uniformly negative results. Sera from both acute and chronic cases were then tested in parallel with the complement-fixation test. With one exception the results of both tests were negative in acute cases; the one case was in an African with an acute infection (which may have been superimposed on an older one) whose complement-fixation test was negative and P.L.T. positive to a titre of 8. Of ten chronic cases the complement-fixation test was anticomplementary in 1, the remaining serum titres being 1/1–4, 1/2–4, and 1/4–1. The P.L.T. was positive in all the cases, the titres being 1/4–5 (of which three were not taken to end-titre), 1/8–3, and 1/64–1. The P.L.T. was negative in a series of cases of non-specific urethritis.

The specificity of the two tests seems to be of the same order, with the balance slightly in favour of the P.L.T.; the sensitivity of the latter is demonstrably greater, P.L.T. titres being from 4 to 16 times as high as those shown by the complement-fixation test. Moreover, the P.L.T., using a specific polysaccharide quantitatively in a pure form, overcomes the vagaries of a bacterial antigen and its standardisation, eliminates its frequent anti-complementary action, and, so far as we can determine, allows the test to be made on mildly hæmolysed sera which vitiate the complement-fixation test. For these reasons we believe that the P.L.T. should supersede the complement-fixation test as a diagnostic test.

COMMENTS

The principle of the P.L.T. is probably applicable to any condition in which serum antibodies are formed in response to an infecting agent from which a specific active fraction can be extracted—e.g., tularæmia polysaccharide hæmagglutination test (Alexander et al. 1950). Apart from bacterial infections, the rickettsial, spirochætal, and protozoan infections would probably repay immediate study.

The underlying mechanism of the test also requires study. Although many bacterial polysaccharides have been shown to be capable of adsorption on to erythrocytes as well as pure protein fractions, not all serologically active polysaccharide complexes are so adsorbable—e.g., the polysaccharide blood-group-A complex cannot be adsorbed on to human group-O erythrocytes. Nor can all active fractions be adsorbed on to all types of cell; those of *Pfeiferella mallei* can be adsorbed on to human, horse, sheep, guineapig, and chicken cells but not on to ox or pig cells, and differences in the amount of active principle required to sensitise different species exist (Boyden 1950).

Since this paper was written, Adler (1950) has reported a specific hæmolysis of this type with *S. typhi* O–901 polysaccharide and rabbit immune serum, using sheep, rabbit, and human erythrocytes.

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Reviews of Books

The Breast

Structure: Function: Disease. Editor: F. D. SANER, F.R.C.S., surgeon, Royal Northern Hospital. Bristol: John Wright & Sons. 1950. Pp. 316. 45*s*.

THIS book is a symposium by fifteen contributors under the editorship of a surgeon. Its value lies in its many-sidedness and in the fresh authoritative manner in which it is largely written, more particularly where it describes the pathology and biology of cancer of the breast and methods of dealing with it. It offers descriptions of new or relatively new techniques such as biopsy, the exploration of the lymph-gland of the second intercostal space, and the limitations of the use of radioactive phosphorus in the diagnosis of malignancy. It also includes an account of plastic surgery for secondary repairs and for æsthetic reasons. One chapter gives a lucid though perhaps slightly personal exposition of the principles governing the use of radiotherapy, and an appendix of statistical data brings into perspective the importance of breast cancer.

In the 316 pages there are nearly 200 illustrations and diagrams. The textual space for each subject is therefore limited, and though fairly common hormonal curiosities such as gynæcomastia receive their due, normal function is scarcely touched upon. But for its size the book is a useful guide for the practitioner in the diagnosis and treatment of pains and lumps in the breast.

The Nutritional Improvement of Life

HENRY C. SHERMAN, Mitchill professor emeritus of chemistry, Columbia University. New York: Columbia University Press. London: Oxford University Press. 1950. Pp. 270. 24*s*.

Professor Sherman is a doyen of American nutritionists, for his early work with Atwater was published as long ago as 1901. This book, he says, completes a trilogy with his well-known works *The Science of Nutrition* and *Foods: Their Value and Management*. It is essentially a history of the discoveries in nutrition during the past fifty years, and an attempt to assess the human implications of the new knowledge. Medical readers will be charmed by the clear manner in which both old and new problems are set out, and will be grateful for the excellent bibliography: yet they will be infuriated too; for often, just when the argument is becoming intricate and interesting, there is an abrupt change down to a simple presentation of well-known facts. Professor Sherman has never really decided for whom he is writing. "Here," the publishers declare, "is the book for everyone, layman or student, who has any interest in the science of nutrition"; but there is far too much tough and disputatious matter to justify this claim. The book deals well with the evidence that by proper attention to nutritional principles we can "both add life to our years and add years to our lives." We trust that Professor Sherman will continue to demonstrate this in his own person, and that in due course his trilogy will grow into a pentateuch. Could book IV be for the pundits and book V for the debutantes, please?

The Physiology of Tissues and Organs

DOUGLAS H. K. LEE, M.D., F.R.A.C.P., professor of physiological climatology, Johns Hopkins University, Baltimore. Springfield, Ill.: C. C. Thomas. Oxford: Blackwell Scientific Publications. 1950. Pp. 159. 30*s*.

IT is always a problem to know where to begin when teaching physiology to students who have only an elementary knowledge of the science of non-living things and of dead specimens of things that once lived. Should one begin at once with a systematic study of physiology and hope that by the end of the course the principles will be plain, or should one skim through the whole subject, building a framework on which, later, the detailed structure may be supported? If the former method is used some students give up hope and conclude that the subject is too obscure for their understanding. If the second method is tried some grow bored at apparent repetition. In either case only the more intelligent or keen realise until much later the links and differences between animate and inanimate, and between all living things. Professor Lee has chosen a third way. He has tried to progress from the familiar background of physics and chemistry to the unfamiliar complexities of the living cell, both in general and in the basic vertebrate types in particular, and from thence to cells arranged to form organs. The organs are considered from the functional point of view. First the requirements for the efficient performance of a given function are outlined, and next the way in which organised cells meet these requirements.

The book is based on class and lecture notes, and the subject matter is condensed. It does not pretend to be other than elementary and stops before the stage of considering systematic physiology is reached. It is refreshing in its approach to the subject and succeeds in suggesting in small compass many interesting possibilities and general principles that should whet the appetite of the beginner. It can be recommended as an introduction to physiology.

Technique of Analytical Psychotherapy

WILHELM STEKEL. Translators: Eden and Cedar Paul. London: John Lane. 1950. Pp. 403. 21*s*.

THIS is a revised edition of the book published in 1939 in which Stekel described his technique for short analysis lasting three to four months. It remains an interesting and stimulating work, with a great deal of practical advice on such matters as the selection of patients, the beginning of treatment, the management of the transference, and the therapist's relations with the patient's family; and the plentiful case-histories are full of instances of Stekel's intuitive skill. His theories do not always convince, and his psychopathology is an eclectic assortment of theories gathered from Freud, Jung, Adler, Nietzsche, and Schopenhauer which he makes little attempt to weld into a formal whole. He lays much stress on the individual, regarding each patient as a unique case for the therapist's study and mastery, and it is as a brilliant tactician rather than as strategist that he will long be remembered.

Industrial Health

An Introduction for Students. R. PASSMORE, M.A., D.M., lecturer in physiology, department of public health and social medicine, University of Edinburgh; CATHERINE N. SWANSTON, M.R.C.S., D.P.H., D.I.H., lecturer in industrial health in the department. Edinburgh: E. & S. Livingstone. 1950. Pp. 110. 4*s*. 6*d*.

WITHIN the limits set by the authors in their preface, this is a successful book. Their aim is to set forth the rules of industrial hygiene, which are, they say, based on "simple and straightforward principles of human physiology and psychology." But in the text they contrive to show that the whole subject is not really very simple. The book emphasises the physiological and sociological rather than the strictly medical and pathological aspects of the subject, and therefore it is somewhat unbalanced. There is a tendency nowadays to soft-pedal the clinical and pathological aspects of medicine and to beat the big drums of sociology. Another way of putting it is that groups rather than individuals hold the stage. It is often forgotten that the individual is just as important as the group. For these reasons we hope that in their next edition Dr. Passmore and Dr. Swanston will add more about medicine, and that they will write more for doctors (and budding doctors) and less for laymen.

In 110 pages they manage to give a surprising amount of information about the distribution of man-power in Great Britain, differential mortality-rates, production figures, and labour turnover. The physical and psychological factors of environment which adversely affect the workers' health are ably discussed. On factory legislation, it is stated that "laws can only lay down minimal standards which are easy to attain and which everyone recognises as just." It would be interesting to have the opinions of employers as to whether they regard the requirements of the Factories Acts and its numerous regulations as "minimal" and easy to comply with: contrary to what this book suggests, there are few employers who reach in all respects the standards set by the factory

laws. But apart from a few such highly debatable statements, the information given is accurate; and the book is a stimulating introduction to industrial medicine in its sociological aspects.

Social Medicine

Editor: IAGO GALDSTON, M.D. New York: Commonwealth Fund. 1949. Pp. 294. $2.75.

THE high cost of medical care and the narrowness of current medical education led to the convening of a conference on social medicine as part of the centennial celebration of the New York Academy of Medicine. Such a representative gathering, including, inter alia, historians, physicians, public-health and nutrition experts, psychologists, and sociologists, expressed in corporate form the underlying conviction that "the days of monastery medicine and the ivory tower are gone." This book is a symposium of the papers contributed during the conference.

The early chapters are devoted to an excellent historical review of the changing relations between medicine and society since the days of Ancient Greece. The portrait of the evolution of social medicine is very clear. Though the individual contributions to the section dealing with the scope and objectives of social medicine are first-rate, the picture as a whole is ill defined: too many varying definitions tend to confuse the reader. The chapters on epidemiology and nutrition are good, but the comprehensive account of the social applications of psychiatry is too weighty for easy assimilation.

The editor has succeeded reasonably well in the difficult task of welding so many individual contributions into a coherent whole. He has been helped to achieve this by the final contributor to the symposium, who makes an eloquent plea for medicine to widen its sphere of interest by close association with the social sciences. Much physical and mental ill health could be prevented if the medical profession had a better understanding of the social relationship of man. In this respect undergraduate education is all-important, for the good family doctor is a sine-qua-non in improving the health of the individual citizens who constitute the real wealth of the nation.

Die Gewebsmastzellen im menschlichen Knochenmark

P. BREMY, Dr.med. Zurich. Stuttgart: Thieme. 1950. Pp. 78. D.M. 7.20.

THE mast cell has had relatively little attention from English writers. This volume reviews the literature on its origin, morphology, and distribution, and quotes work suggesting that its function is bound up with the production of heparin and possibly histamine. Mast-cell tumours have been encountered only in animals. In human subjects increase of the mast cells in the marrow is seen in severe infections, toxic conditions, amyloidosis, and after X-ray irradiation. Dr. Bremy presents 20 cases of his own, showing increased mast cells in the marrow; 5 were cases of anæmia due to tumours, 7 had aplastic anæmia, 1 had hæmochromatosis, 3 had Marchiafava hæmoglobinuria, and in 4 the origin of the anæmia was unknown. It is suggested that the increase of mast cells is a defence mechanism. The book is illustrated by a few unimpressive photomicrographs in monochrome.

Personality in Peptic Ulcer

A. J. SULLIVAN, M.D., head of the section of gastro-enterology, Ochsner Clinic; T. E. MCKELL, M.D., member of the staff of the clinic. Springfield, Ill.: C. C. Thomas. Oxford: Blackwell Scientific Publications. 1950. Pp. 112.. 21*s*. 6*d*.

ALL interested in peptic ulcer will enjoy reading this little book, written by physicians for physicians, and based on the observations of two gastro-enterologists of the Ochsner Clinic, Tulane, who studied the psychic as well as the somatic aspects of something over 1000 peptic-ulcer patients. Their technique of establishing personality traits is simple and could readily be repeated. They recognise a main personality type which accounted for 72% of their patients; indeed the characteristics of this type, they say, can usually be demonstrated "in less than five minutes of questioning." They call the integrating drive in this behaviour pattern a "craving for superiority," and are impressed by its "healthy" concern with solid achievement; for in its search for new goals it rides roughshod over all forms of self-indulgence, such as holiday-making, sleeping, and even eating. It is one thing to recognise a need for superiority: but to raise it to the status of "a primordial urge for success" betrays an excess of zeal over prudence in the investigators. Their peptic-ulcer type is the extravert philistine who works at high pressure, talks big, admires skyscrapers, and thinks in terms of material achievement. American culture, rather than a "primordial urge," is at the back of this emphasis on, and concept of, success. This type of personality was absent in 11% of their patients; these had an underlying need to be fed and be taken care of, consistent with the psycho-analytic concept of peptic ulceration formulated by Franz Alexander. The book has a number of entertaining visual aids intended to fix the personality traits in a student's mind. The authors give illustrative case-histories, and present a formula embracing the important variables of heredity, emotional situation, local trauma, and intrinsic gastroduodenal factors. They suggest that the relative value of each should be explored and treatment undertaken accordingly.

Some Applications of Nuclear Physics in Medicine

W. V. MAYNEORD, D.SC., F.INST.P. London: British Institute of Radiology. Suppl. no. 2. 1950. Pp. 290. 35*s*.

THE chief applications here considered are those of beta-radioactive phosphorus, iodine, iron, and sodium, though cobalt comes in as a gamma-ray source of growing importance. The radiologist will be fairly certain of getting the sort of information he needs, whether it be as a therapist or diagnostician; this applies not only to the actual nature of the substance in question and to the kind of radiation it emits, but also to the methods of dosimetry suitable to the operating conditions. A brief section on the medical use of high-energy quanta takes the reader as far as he needs to get a proper grasp of the betatron, the synchrotron and the latest form of linear accelerator. It is for him to decide what biological warrant there is for the use of high-energy quanta in the treatment of cancer; what he will get from Professor Mayneord is a full presentation of the facts from the physical standpoint.

Atlas of Obstetric Technic (2nd ed. London: Henry Kimpton. 1949. Pp. 197. 52*s*. 6*d*.).—This book, by Dr. Paul Titus of Pittsburgh, has gone through three reprints of the first edition in the last few years; and it will therefore be more appropriate to offer useful criticism than to recapitulate its good points. Some 200 of the illustrations deal with obstetrics, but a surprising number are concerned with what may be termed obstetric gynæcology. All are line drawings by Dr. E. M. Shackelford, and it is always easy to follow exactly what is meant. Notable omissions from the text are the manipulations necessary for the eventual delivery of the fœtus lying transversely, or the almost impacted shoulders of a very large baby. Many small but helpful items in technique might have been included—the careful dissection of peritoneum before the incision of the uterine muscle in cæsarean section, or the introduction of sutures before episiotomy is done. Perhaps external pelvimetry might be deleted to make more room.

Biological Actions of Sex Hormones (2nd ed. London: Cambridge University Press. 1949. Pp. 615. 42*s*.).—The first edition of this book by Mr. Harold Burrows, F.R.C.S., was published in 1945, when such a competent review was very welcome, particularly to those returning from the pre-occupations of war-time work. The new edition has been revised and is even more valuable. "Throughout the essay," says the author, "literary daintiness has been held of second importance to clarity of statement"; but the implied apology is superfluous, and the "essay" is an admirable contrast to those "reviews" which read like a series of excerpts from abstracts. Yet the book deals comprehensively with the great volume of experimental work on the actions of sex hormones, particularly in mammals; it is well indexed and has a long bibliography. The subject is considered essentially from the laboratory point of view, with the human taking its place among other experimental animals; but a scientific background is provided for the clinician as well as perspective for the research-worker.

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THE LANCET
LONDON : SATURDAY, DEC. 9, 1950

The Second Premise

As our correspondence columns have shown, opinions differ widely on the proposed dismissal of hospital registrars. Our own have been based on three premises :

1. The number of registrars in training for senior posts should not grossly exceed the number of likely vacancies.
2. Except in a few specialties, the only senior post open to a registrar is that of full consultant.
3. A rapid increase in the number of consultant posts can no longer be expected.

If all three premises are valid, the Ministry's cut is inevitable : a great many registrars will have to go. Yet it is increasingly apparent that the National Health Service would thereby be damaged rather than improved. In the long run general practice would gain by absorbing some able men and women from the hospitals ; but this advantage would, we believe, be more than offset by the loss to many hospitals through their departure, and the waste of much of their talent and training. No doubt some of their present work could be done by existing consultants, some by housemen, and some by clinical assistants ; but much of it would not be done so well, or would not be done at all ; for it is the presence of responsible trained registrars that has raised the standard of so many departments. In other words, the decision will positively downgrade the hospital service, and in present circumstances it will do little to upgrade general practice. If this is true—if the consequences of acting on our three premises are going to be bad—possibly there is something wrong with the premises themselves ?

Apart perhaps from the registrars of St. Lukes' Hospital, Bradford,[1] who declare themselves willing to face intensive competition leading to survival of the fittest, few have challenged our first premise —that the number of registrars in training should not grossly exceed the number of likely vacancies. This principle is accepted equally by the profession and by the Government, and will certainly be maintained. Our third premise has been widely and forcibly questioned ; but we still think that, at a time when hospital building is approaching a standstill, it is unrealistic to suppose that the establishment of consultants can soon be brought up to the optimum contemplated in the Ministry's *Development of the Consultant Services*. The best hope of finding a practicable solution of the registrar problem lies rather, we suspect, in reconsidering the principle embodied in our second premise—namely that (save in exceptional circumstances, where the appointment of a senior hospital medical officer is tolerated) there shall be no grade of hospital doctor intermediate between the senior registrar in training and the consultant enjoying full and final clinical responsibility. This principle was advanced by the profession, not by the Government ; but many in the profession are beginning to wonder whether it is sound. Do not common sense and the needs of the service demand that many of the present registrars, on completing their training period, should remain in hospital work as what Dr. MACWILLIAM[2] calls " assistant consultants " ?

With his usual vigour and cogency, Dr. FRANGCON ROBERTS in his letter this week points out that the situation has changed since the unplanned days when the number of consultants depended on the support of the fee-paying public ; and he calls for a review of the new needs. Such a review would have to be rather more radical than that entrusted to the Spens Committee[3] when it was asked to say what remuneration consultants and specialists should receive in a national medical service. The committee interpreted its brief widely, and was wise and far-seeing in its proposals for the livelihood of registrars as well as consultants ; but it somehow ignored the fact that much hospital work can suitably be done by men and women who cannot be fairly classed as either. The unhappy sequel was that, in accepting the report, the Ministry of Health left everyone imagining that all specialists would be paid on Spens scales ; and when, much later, it announced that many of them would be graded only as senior hospital medical officers, the profession as a whole resented what looked like an attempt to man the specialist services on the cheap. An uneasy compromise was reached when professional bodies persuaded the Ministry to confine the S.H.M.O. grade to specified specialties[4] ; but the effect of this compromise is that many senior registrars, who are highly trained physicians, surgeons, or obstetricians though they have so far failed to secure a full consultant post, are now to be invited to leave the hospital service for general practice. Clearly this state of affairs, arising more from conflict than from objective planning, demands the reconsideration for which Dr. ROBERTS appeals. The fact that a review of hospital medical establishments is even now in progress makes it all the more necessary that the Ministry, having deferred action so long, should stay its hand until the implications have been studied more closely.

At least one basic question has not yet been answered, or even perhaps posed, by the Ministry or the profession. Is it really advisable that full consultant status should be conferred, as the Spens Committee recommended, at the end of the training period —normally round about the age of 32 ? Unless a man is unusually talented and mature, this is an early age at which to take on the responsibilities which, as Dr. ROBERTS says, the word " consultant " ought to imply. One result of such early promotion is that consultant status lasts some 33 years, whereas registrar status—even including junior posts—lasts

1. *Lancet*, Nov. 25, 1950, p. 653.

2. *Ibid*, Dec. 2, 1950, p. 714.
3. Report of Interdepartmental Committee on the Remuneration of Consultants and Specialists. 1948. Cmd. 7420.
4. See *Lancet*, Oct. 14, 1950, p. 476.

about 7; and in practice this means that the consultants greatly outnumber their juniors in training. If registrars did no more than receive instruction, this numerical discrepancy would not matter; but they do many other things. Drawing a military parallel, Dr. CHARLES HILL [5] remarks that "a captain in the Army is not only training to be a colonel; he is at the same time doing a captain's work." Are we not in some danger of reproducing the inconveniences of an army in which there are more colonels than majors and company-commanders? Admittedly there are objections to doing advanced clinical work in a capacity that is even nominally subordinate. But the plain fact is that such work is being done satisfactorily by senior registrars all over the country, and it seems a little odd to tell them that they must forthwith stop doing it because, now that their training is over, our principles forbid us to offer them anything less than the consultant posts they cannot get. How deeply are these principles founded? Are they, actually, much more than a vigorous opposite reaction to the Ministry's unexpected and disappointing introduction of the S.H.M.O. grade? The crisis over the registrars may serve a useful purpose if it causes such questions to be asked. Until proved otherwise, this crisis should be regarded as a symptom of some underlying defect in our system, which needs to be exposed and corrected.

Some reduction in the number of registrars is desirable as well as inevitable; but the Ministry's drastic cut is neither the one nor the other. It might, we suggest, be avoided if the profession were to abandon its opposition to an intermediate grade between registrar and consultant. To posts in this grade, which would replace that of S.H.M.O. and might command comparable remuneration, men would be appointed competitively after finishing their registrar training. Under the title of assistant consultant, junior consultant, or (perhaps better) specialist, they would continue to work under the general supervision of a consultant, and as opportunity offered they would apply for consultant posts. Doubtless a few of the more brilliant would gain these as early as they do now, but the normal time of attaining consultant status would probably be nearer 40 than 32, and those who did not secure consultant appointments could if they wished go on doing their chosen work, without this recognition, to the end of their career. The time has come when the advantages and disadvantages of such an arrangement should be thoroughly debated. For our part, we hope that our second premise may prove to be removable.

Mass Radiography

IT takes time to learn to handle a new tool, even when we are guided by experts. When the tool itself is new there are no experts; and those who use it must learn its possibilities together. Mass radiography is undoubtedly a tool of great value, but at the meeting of the Tuberculosis Association on Nov. 24 several speakers doubted whether we had yet discovered its proper purpose. Our hope has been to sift out from the general population those suffering from early tuberculosis or other serious chest disease and to ensure that they receive early treatment. That mass radiography can in fact be used in this way is certain. Dr. PETER KERLEY quoted as an example the 332 cases of active tuberculosis discovered by CLUTTERBUCK'S unit at Glasgow, and followed up. These patients stayed on an average 6–7 months in hospital, and there were only 3 deaths among them; in a comparable control group the average stay in hospital was 18 months, and there were many more deaths. No-one would attempt to belittle the importance of such results; but they must be seen in relation to the situation as a whole. The tuberculosis service needs much costly renovation: it lacks new quarters and equipment for the dispensaries and chest clinics, more beds, more staff. Mass radiography, as used at present, is expensive. Dr. HOFFSTAEDT, whose contribution to the discussion we publish on another page, estimates that, using this method in an unselected population, the cost of finding a new case—that is, a case not already known to the clinics—may range from £11 to something like £109 (or, in exceptional circumstances, to more than £600), depending on the incidence-rate and on the overhead expenses of the unit. Some feel that we should not be spending so much on finding new cases when we are not yet providing adequate treatment for those already found. Again, mass radiography can offer only a partial and incomplete contribution even to the task of case-finding. At present we can only hope to survey about 7% of the general adult population yearly; and 80% or more of our case-finding is still done by other methods. If we could survey the entire population annually it might be different; but, apart from the fact that this would occupy the time of far too many people, the cost would be prohibitive. Moreover, would an annual survey suffice? Often enough people are found to have tuberculosis, sometimes already cavitating, who a few months or weeks before gave a normal radiograph in a mass survey. Nor is diagnosis from a miniature—or indeed any other—film infallible, as various tests have shown.

These considerations all suggest that we are trying to use mass radiography in the wrong way. In the Newcastle region, as Dr. HOFFSTAEDT tells us, there are plans for applying it only to industries and groups where a higher proportion of positives may be expected than in the general population. These include industries with a dust hazard, especially those employing young women; school leavers, school staff, and all others in regular contact with children; young people entering the Forces (among whom, as mass radiography has already shown, new cases are very likely to be found); prospective employees whose employers wish them to be examined; women attending antenatal clinics; chronic sick; suspects referred by doctors and chest clinics; contacts; and volunteers from the general population. These selected groups will provide plenty of work for the units, and must inevitably give a better yield of new cases than would equal numbers of unselected population. Suspected cases might well be sent for radiography on a 5 × 4 in. film of the type described by Dr. OWEN CLARKE, and only those in whom the findings are positive might then need a full-size film. Miniature radiography could in this way be used economically and effectively, thus perhaps releasing funds for use in other parts of the country's chest service.

5. *Daily Telegraph*, Dec. 4, 1950, p. 4.

Surgical Relief of Angina Pectoris

THE surgical approach to angina pectoris has been mainly of three types. In the first the demands on the coronary circulation are decreased by lowering the basal metabolic rate. Some years ago total thyroidectomy was adopted for this purpose [1]; but latterly hypothyroidism has been induced by thiouracil and its derivatives.[2] In the second type of approach an attempt is made to revascularise the heart by attaching to its surface either omentum,[3] muscle,[4] or lung [5] as a pedicle graft. Alternatively, anastomosis between the coronary end-arteries is promoted by applying to the surface of the heart foreign particles which evoke an inflammatory reaction.[6] Other measures said to increase the blood-supply include ligation of the coronary sinus,[7] pericoronary neurectomy,[8] and various forms of direct arterial anastomosis.[9] In the third approach the afferent sympathetic pathways from the heart are divided; concurrent division of the efferent sympathetic fibres to produce vasodilatation, though probably less important, may improve the result. This third—neurosurgical—approach commands most attention; but sympathectomy has never become as popular in angina as in hypertension [10] and peripheral vascular disease.[11] This is not surprising in view of the poor prognosis for patients with angina; indeed with this condition the tendency is often to avoid any but the most pressing operations. With other diseases we at least *hope* that sympathectomy will improve the prognosis as well as relieving symptoms: with angina we can only hope that sympathectomy will make the patient's remaining days more comfortable.

The development of neurosurgical procedures for angina has followed, and contributed to, progress in our knowledge of the pain pathways from the heart. Most workers agree that the majority of pain fibres pass through the inferior cervical and the upper 3 or 4 thoracic sympathetic ganglia on both sides.[12] From there they traverse the white rami communicantes and enter the spinal cord through the posterior roots of the corresponding segments. The rational procedures are therefore:

1. Posterior rhizotomy, in which the upper 4 or 5 thoracic roots are divided on both sides. Some surgeons report most favourably on this procedure,[12 13] but others have been less fortunate.[14]

2. Paravertebral block with procaine [15] or with alcohol.[12] The procaine method may give protracted relief. The alcohol method provides relief in about 60% of cases, but it carries an appreciable mortality-rate and has other disadvantages.

3. Cervicothoracic ganglionectomy, in which the stellate and upper thoracic sympathetic ganglia are removed on one or both sides. This has replaced the older operations in which various parts of the cervical chains alone were removed. WHITE and SMITHWICK [16] and SJÖQVIST go down to T3 segment, while OLIVECRONA[14] goes as low as T4 or T5. All these surgeons prefer the anterior [17] to the posterior approach; for patients with angina do not tolerate the prone position. General anæsthesia is probably better than local, and the sympathetic chain should be well infiltrated with procaine before it is manipulated.[18] Lighted rètractors greatly reduce the difficulties of the operation.

LINDGREN [19] has made a valuable study of the results in 105 cases, treated by cervicothoracic ganglionectomy in OLIVECRONA's (80 cases) and SJÖQVIST's (25 cases) clinics in Sweden, taking as controls 88 unoperated cases. Briefly her findings are these. The operative mortality was 8·5%, and the remote mortality-rate up to two years was the same in the operated as in the unoperated group. Three-quarters of the patients had relief from pain on the side of the operation, and in two-thirds the capacity for work was increased. More than half had a bilateral operation, performed first on the side where the pain was worst (usually the left); the two stages should be divided by an interval of at least two months. In a third of the patients migration of the pain towards the head took place after operation, and in 10% this vitiated the result. Relief of pain does not remove a "warning signal," for after operation all the patients had *some* residual pain or pain-equivalent: the feeling of substernal oppression which accompanies the pain in the anginal syndrome was unaffected. On the other hand, the anxiety which many experience was greatly alleviated. The pulse-rate was slowed after bilateral operations, but there was no effect on the blood-pressure or heart-volume, and no consistent effect on the electrocardiograph (E.C.G.) readings. Two troublesome complications were traumatic neuritis and nasal congestion. Taking account of all factors, a satisfactory result was achieved in over half the cases. LINDGREN suggests that the operation "should be reserved for a group of patients who, after an adequate period of observation, cannot be controlled effectively on a medical régime." (It may also be of value in certain cases of hypertension after thoracolumbar sympathectomy.[20]) It is contra-indicated in patients (*a*) with hypertension in whom myocardial infarction has been followed by a permanent drop in blood-pressure, (*b*) with an E.C.G. indicating myocardial damage combined with cardiac enlargement, and (*c*) with moderate or considerable cardiac insufficiency.

Judging by the results of operation, it seems that most clinicians are too conservative in the management of angina. We should like to see more of these operations performed in Britain and elsewhere, so that their value may be finally assessed. Paravertebral injections of alcohol cannot be regarded as a simpler and safer method of achieving the same result.[18]

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Annotations

CHLORAMPHENICOL ON PRESCRIPTION

As reported on p. 759, chloramphenicol ('Chloromycetin') is now manufactured in this country in sufficient quantity for it to be dispensed on prescription. This antibiotic is the only one which is produced by synthesis on a commercial scale. It is given by mouth, but because of its extremely bitter taste must be taken in capsule form; it is not suitable for parenteral injection. A number of infections which are resistant to penicillin and streptomycin respond to chloramphenicol —namely, the enteric fevers, rickettsial diseases (including Q fever), virus infections of the lymphogranuloma —psittacosis group, atypical (virus) pneumonia, and acute brucellosis. These are the main therapeutic indications for the new antibiotic. In addition it is of value in urinary-tract infections due to penicillin-resistant or sulphonamide-resistant strains of *Bact. coli*, proteus, *Staphylococcus pyogenes*, and *Strep. fæcalis*; it is less effective against *Pseudomonas pyocyanea*. Chloramphenicol should be used with discretion in urinary-tract infections; careful search for underlying obstruction should be made in all cases. For controlling the infection alkali therapy or sulphonamides are the treatment of choice; in the acute cases which fail to respond, sensitivity to sulphonamides, penicillin, streptomycin, and chloramphenicol should be tested and treatment given accordingly.

Chloramphenicol has a considerable antibacterial action against flora of the respiratory and intestinal tracts. Preliminary reports suggest that it may be beneficial in whooping-cough; this problem requires further investigation and trials are being carried out at a number of centres in this country. With an adequate oral dose chloramphenicol reaches therapeutic levels in the cerebrospinal fluid, and very satisfactory results have been reported in *Hæmophilus influenzæ* meningitis. Serious toxic effects are rare though granulopenia has been reported.[1] Anorexia, nausea, and looseness of the stools are not infrequent; glossitis, stomatitis, pharyngitis, and proctitis occasionally develop and seem to be due to yeast infection. These complications usually clear up rapidly when the drug is stopped.

Chloramphenicol is the first of the new oral antibiotics to be released. Experience has shown that in this country there are a few, but only a few, diseases resistant to penicillin and sulphonamides for which its value is clearly established. In our admiration for the new specific remedies we are apt to overlook their cost, particularly when this is included in a national rather than a personal budget. Moreover, the newer the remedy, the higher the price. One week's treatment with sulphonamides or penicillin costs approximately 10s.; six days' treatment with chloramphenicol costs £10 at current prices. From every point of view therefore it is in the best interests of the patient that treatment with the newer antibiotics should, wherever possible, be subject to strict bacteriological control.

1. Volini, I. F., et al. *J. Amer. med. Ass.* 1950. **142**, 1333.

MECHANICAL HEART AND LUNGS

THORACIC surgeons have long dreamed of a machine which will take over the duties of the heart and lungs while they are operating on these vital organs. Gradually their dream is approaching fulfilment, and many hospitals throughout the world—the Sabbatsberg in Stockholm, for example, and Hammersmith Hospital here in London —have mechanical heart-lungs working efficiently.

Hitherto, mechanical heart-lungs have been used solely to supply oxygenated blood to the brain; but in Philadelphia, after years of experiment, Gibbon[1] has completely diverted the dog's blood-stream from both venæ cavæ and successfully returned it to the circulation. Four dogs are still alive and well 8–10 months after having their blood-stream diverted in this manner for 30–46 minutes. In Stockholm, Björk[2] has devised an apparatus in which a series of revolving plates are partly immersed in a trough of blood in an atmosphere of oxygen; this allows an oxygen uptake of about 130 ml. per minute with a blood-flow of 800 ml. per minute; so it seems to be somewhat more efficient than the method of Gibbon which introduces up to 70 ml. of oxygen per minute.

The difficulties of applying these methods to man remain formidable. The patient's blood must be heparinised; and the machine requires preliminary priming with compatible blood. Insertion of the cannulæ is likely to raise further difficulties. In the dog, Gibbon has ingeniously reached the superior vena cava through the stump of the azygos vein, and the inferior vena cava through the right auricular appendage. This technique necessitates an approach through the right side of the chest; and in operations on the mitral valve, for example, the burden of bilateral thoracotomy might prove too heavy for the average patient. Nevertheless, Stokes and Gibbon have taken us another step towards the ultimate goal.

1. Stokes, T. L., Gibbon, J. H. *Surg. Gynec. Obstet.* 1950, **91**, 129.
2. Björk, V. O. *Acta. chir. scand.* 1948, suppl. 137.

TUBERCULOSIS AND HEALTH WORKERS

NURSES who acquired tuberculosis in the course of their work were, until recently, likely to experience much hardship. No special provision was made for their care or maintenance, and many of them ended their lives almost in penury. Since the introduction of larger tuberculosis allowances such extreme hardship has disappeared; but the position of nurses differs from that of others who acquire tuberculosis in that they usually enter nursing training during their most susceptible years, and are exposed to greater risk of tuberculous infection than people in other walks of life. There is no doubt that they can be very largely protected from this added risk by special precautions to safeguard their health; or that, if they acquire it, they stand a good chance in most hospitals of being treated early and successfully: these, indeed, are proper objects at which every hospital should aim. Moreover every hospital should see to it that nurses are fully reabled, preferably on full pay. But there are still hospitals which fail in these duties. The decision of Dr. Edith Summerskill to insure, under the National Insurance (Industrial Injuries) Act, nurses and other health workers in close and frequent contact with tuberculosis infection, though a welcome, if tardy, recognition of the nurse's special risks, must in no sense be regarded as a substitute for proper standards of care. (Court[3] found that "the risk of contracting tuberculosis is significantly greater for nurses in most general hospitals than for other professional women of the same age.")

The Minister based her decision on a report,[4] just published, by the Industrial Injuries Council, under the chairmanship of Sir Wilfrid Garrett. The council had in mind the great disparity between the standards of precautionary measures in different hospitals, and frankly declared "there is little prospect of a close approach in the near future to ideal conditions in all the hospitals concerned." But they evidently felt that to prescribe tuberculosis as an industrial disease might well hasten rather than retard a general levelling up. Claims might be reduced effectively, they hold, if a wider

3. Court, D. *Lancet*, 1949. ii, 874.
4. Tuberculosis and Other Communicable Diseases in Relation to Nurses and other Health Workers. Cmd. 8093. London: H.M. Stationery Office. 1950. Pp. 20. 6*d*.

use of protective measures can be ensured, and they hope the Ministry of National Insurance will give the Ministry of Health and the Department of Health for Scotland "every possible assistance to this end." Moreover, the Ministry might ask for a report, on each claim made, of what precautions had been taken or omitted by the claimant, and the establishment in which she or he had been employed.

Like others interested in this subject they have been impressed by the dearth of statistics showing the incidence of tuberculosis in different classes of the community; and they point out that statistics based on claims could be used to show the comparative incidence-rates of the disease in particular industries and occupations. Those who have to find staff to nurse the tuberculous in sanatoria and chest hospitals have always feared that any public emphasis on the chances of infection might injure recruitment; but experience has proved that nurses are not deterred by risks they know and understand and against which they recognise that precautions are being taken. They are made much more uneasy by their own vague doubts and fears and those of their family and friends. When E. K. Geer,[5] in 1931, instituted rigid precautions in Anoker Hospital, St. Paul, he reminded patients and staff repeatedly that "eternal vigilance is the price of safety." He found that these precautions did not frighten nursing candidates off, but had just the opposite effect. Dr. Horace Joules, at the Central Middlesex Hospital, warns candidates and their parents that his nurses are expected to nurse tuberculosis, but explains the measures taken to protect them; and he never gets a refusal. The fact that the community is willing to recognise the risk, and compensate the nurse for taking it, may even help rather than hinder nursing recruitment.

The council recommended that the disease should be presumed to be due to the nature of the nurse's or health worker's employment unless the contrary is proved, and that the period of presumption should begin 6 weeks after entry into the work and end 2 years after the date of leaving it. One dissentient held that a year after the date of leaving would be adequate. The fact that other health workers are included gives equal privileges to doctors and others, who may also be exposed to risks of infection. The council deliberately confined themselves to tuberculosis, deferring any consideration of other communicable diseases until experience had been gained from this initial inquiry. The regulations are to be made as soon as they can be worked out with the health Departments.

FLUID BALANCE

THE record attendance at the Medical Society of London on Nov. 27 testified to the importance now generally attached to the balance of fluids and electrolytes in the body. Dr. H. L. Marriott opened the proceedings with a lucid account of the subject, which he has done so much to advance. About a ton of fluid passes in and out of the human body every year, he said, and yet its water-content in health remains remarkably constant. About five-sevenths of the body water lies within the cells and the remainder is extracellular fluid (tissue fluid and plasma). Pitting œdema is usually evidence that at least a gallon of water has already accumulated in the tissue spaces owing to changes in intracapillary osmotic or hydrostatic pressure or to water and salt retention. Œdema due to hypoproteinæmia does not appear until the plasma-proteins are grossly depleted and the body's reserves of mobile protein exhausted. Once present, it takes a long time to go, even on a high-protein diet; powdered skimmed milk is a good source of protein, but the equivalent of a bathful of milk may be required! Dr. Marriott discussed the mechanical removal of œdema fluid, the indications for restriction of salt, the question of water intake, and the use of mercurial diuretics. Dehydration arises from insufficient intake of fluids or loss of alimentary secretions or sweat. If the fluid intake is inadequate, deficiency is essentially of water, and the osmotic pressure of the extracellular fluid rises; water passing out of the cells creates a sensation of thirst. If, on the other hand, the patient is losing bodily secretions—e.g., by diarrhœa or vomiting—deficiency is of water and salt, and his dehydration will not respond to ingestion of water alone. Salt depletion, said Dr. Marriott, is often missed; yet the type of dehydration present is easily determined by simply asking oneself the question—how has it arisen?

Dr. N. R. Lawrie reviewed the work of E. A. Schäfer and E. B. Verney on the rôle of the pituitary in the control of diuresis. Thanks to them, he said, it is now known that the posterior pituitary secretes an antidiuretic factor in response to changes in the osmotic pressure of the serum reaching it: this system is so sensitive that a change of 1% in osmotic pressure leads to a 1000% change in renal excretion. The hormones of the suprarenal cortex are also concerned in the retention of sodium chloride, and so of fluid; since more sodium is retained than chloride, the administration of these steroids may lead to alkalosis as well as œdema. In the discussion, Sir Heneage Ogilvie observed that soldiers are taught to manage on a very small water ration, and expressed the view that some of the mortality among the wounded during the war could be attributed to dehydration. Mr. Dickson Wright deprecated the excessive use of the intravenous route; when he went round his wards at night and took down the houseman's drips he felt that he was doing a useful piece of work. Dr. F. Avery Jones thought that the potassium ion was not receiving the attention it deserved. The traditional meat extracts, he said, are rich in this essential factor, but if the patient cannot take anything by mouth, potassium may be added to infusion fluids. Dr. Marriott agreed that potassium is an "up-and-coming" ion: but it can also be a dangerous ion, especially if renal function is poor.

A working knowledge of the theoretical background of fluid balance has become essential to every practising surgeon. The distinction between the two types of dehydration—water depletion and salt depletion—is particularly important, though both may of course be present at the same time. As Dr. Marriott pointed out, a consideration of the cause of the condition may tell us which form we are dealing with: on the chemical side, the serum-sodium level is the only certain guide (as Dr. D. A. K. Black remarked in the lecture summarised on p. 778), but estimation of urinary chloride will often help. With the invasion of the hospitals by pure science, pathology laboratories are being submerged with requests for estimations of unequal value to the patients. But the measurement of the urinary chlorides can frequently facilitate the rational treatment of postoperative vomiting without adding to the pathologist's burden; for Fantus's test, performed in the side-room, will usually help in the decision as to whether saline is indicated or not. If the house-surgeon does this simple test himself, he need have no compunction in asking the clinical pathologist to estimate the serum-potassium in selected patients. Possibly soon many hospitals may have facilities for rapid estimation of sodium and potassium by flame spectrophotometry.[1 2] Elaboration of data will make even greater the need for increased study and understanding by clinicians of the problems of fluid balance.

5. *Amer. Rev. Tuberc.* 1931, **29**, 88.

1. Wynn, V., Simon, S., Morris, R. J. H., McDonald, I. R., Denton, D. A. *Med. J. Aust.* 1950, **1**, 821.
2. Spencer, A. G. *Lancet*, Nov 25, 1950, p. 623.

THE DOCTOR AND ATOMIC WARFARE

MAN'S tolerance of adversity is always greater in the event than in the forecast; during the late war civilians in Britain—and in other countries as well—shouldered calmly a far greater burden of anxiety and hurt than had been thought possible without disintegration of the social structure. No doubt the same would happen in the even more dangerous conditions of a new war. But in the future, as in the past, to tolerate is not enough: our inclination, and our duty, is to survive; and the best hope of surviving the strange new dangers we shall face lies in learning what is known of them. Thus the editors of the *Practitioner* have done well to publish this month a symposium on the medical aspects of atomic warfare. Among other things this disposes of the contention that physical preparation is futile; it is estimated that with a Nagasaki-type bomb among a population of density 43 per acre, if everyone were in houses deaths would number 31,100 and injured 29,500; but if everyone were in a reinforced brick surface-shelter deaths would be 14,300 and injured 10,500. However, preparation does not end with the construction of shelters; much would depend on intelligent action by the public. As Sir Ernest Rock Carling (who has advised on the symposium) remarks in his article on morale: "Safety will be chiefly in behaviour, and behaviour can be learned so thoroughly as to become instinctive." Here our profession has a large share of the responsibility, for "medical men are better able than others to appreciate the risks, and should know what can be done to avoid them or to mitigate their results. No one, perhaps, is in a better position to inculcate the right attitude of the people to danger."

EXPLOSIONS IN THE OPERATING-THEATRE

WHEN Dr. H. J. V. Morton ignited 20% cyclopropane in oxygen at the Royal Society of Medicine on Dec. 1, he provided the members of the anæsthetics section with a practical demonstration which they will not quickly forget; and when a succession of speakers described the innumerable sources of heat in a theatre, and the inflammability of almost every known anæsthetic mixture, their hearers must have wondered how they had survived long enough to attend the meeting at all. However, the comparative rarity of explosions in the operating-theatre cannot justify the neglect of precautions; these are accidents which can and must be prevented.

In his presidential address, Dr. Alexander Low pointed out that long-continued storage of ether (particularly in sunlight) leads to the production of peroxides which enhance its inflammability—and this includes its use for sterilising skin. It explodes more violently in nitrous oxide and oxygen than in pure oxygen, he said, and is safest of all in air. Cyclopropane is generally used in a closed circuit in this country, and it diffuses safely from a small leak unless there is a source of heat within one foot; but the stomach can easily come to contain an explosive quantity. Dr. Low then considered the sources of heat in a theatre. The use of electricity involves not only the danger of sparks, but also of heat production owing to overloading; dry batteries are safer than mains transformers. Static electricity can be generated in many ways—by sweeping a dry blanket over a rubber mattress, by the passage of gas through rubber tubing, and so on—and the only sure safeguard is the use of conducting rubber and the provision of conductors which lead away the charges to earth. Non-electrical sources of heat include sterilisers, candles, lamps, hot-air syringes—and cigarettes!

Several speakers had personal experience of explosions and fires, and told hair-raising stories of the ways in which they were caused. One explosion was the result of propping a cylinder full of gas against a hot radiator; another should have occurred, but apparently never did, in a nursing-home where the Ministry regulations were hung above the naked jet of a geyser in the theatre.

Dr. Low described at some length the precautions which should be observed in the ideal theatre: they may be laborious, but they are well worth while. Sources of heat are more easily controlled than explosive mixtures, but neither should be neglected. The universal use of conducting rubber in the theatre[1] is one of the most effective steps that can be taken to eliminate "static"—which even in our damp climate is the greatest danger. The floor must be a good conductor, and to it all apparatus and every person in the theatre (including the patient) should be properly earthed. Trolley wheels should be fitted with conducting rubber tyres, or be replaced by metal castors: other equipment should be provided with drag chains of unpainted metal links.[2] Other sources of heat are more obvious and so less dangerous, but all electric fittings and switches should be continually checked by the electricians, and even minor faults remedied immediately. Finally, the prevention of faults in the anæsthetics apparatus is the responsibility of the anæsthetist, who must of course be fully acquainted with the mechanics of his machine, as well as with the inflammability of every gas and every mixture with which he works.

PAY IN THE FORCES

FOR some time the British Medical Association has been negotiating for improved pay of doctors in the Services; and last week the Minister of Defence announced new rates, which appear on p. 776 of this issue. Broadly speaking, the remuneration of general-duty officers now compares fairly with average incomes in civilian work; but the rates for specialists do not. The greatest need of the R.A.M.C. is for more specialists; and the new rates promise no permanent relief from the unsatisfactory situation in which the Service advertised for civilian specialists to serve for limited periods on specially attractive terms.

AN INFORMATIVE YEAR

TODAY the administrator is more and more dependent on a reliable information service which will tell him how the statutory instrument which seemed so clear and comprehensive in Whitehall strikes the captious realists in the queue at the food office. The Ministry of Health has been quick to realise how much help they can get in their new responsibilities from the Central Office of Information.[3] A Survey of Sickness has been made every month for the Registrar-General, and a special inquiry into schoolboy diets was made for the Ministry of Health. This showed that schoolboys in the poorer sections of the population today had diets as good as middle-class children before the war. The C.O.I. has also helped the Ministry in its campaign to secure the immunisation of children against diphtheria. Last year about £30,000 was spent on press and poster advertising; but at a cost of £40 per case of diphtheria the sustained campaign is now helping to save up to £2 million in one year, for the notifications of diphtheria have fallen from 55,000 to 5000 during the past ten years. The campaign for the prevention and treatment of venereal disease also continued, and the campaign for blood donors raised their numbers to nearly 378,000 as against 108,000 at the end of 1946. The Health Depart-

1. Bulgin, D., Llewellyn, F. J., Thomas, G. *Lancet*, 1949, **1**, 789.
2. Lee, J. A. *Post-grad. med. J.* 1950, **26**, 365.
3. Annual report of the Central Office of Information, 1949–50. Cmd. 8081. H.M. Stationery Office. Pp. 35. 1*s*.

ment in the film *Another Case of Poisoning* gave effective warning of the dangers of handling food carelessly, and in *His Fighting Chance* showed how the patients' chances of recovery from poliomyelitis have improved. Two specialist films were also made for doctors and nurses —one on bronchography and the other on infection in hospitals.

THE BLAIR-BELL MEDALLIST

A GREAT and well-deserved honour was paid to Prof. J. M. Munro Kerr on St. Andrew's night when the obstetrical section of the Royal Society of Medicine made him the first recipient of its Blair-Bell medal, which is to be awarded quinquennially to the man or woman who has done most to advance the science of obstetrics and gynæcology. Mr. V. B. Green-Armytage, president of the section, said that for over fifty years Professor Munro Kerr has adorned and embellished his profession and specialty: "for over fifty years he has, as you know, fired and enthused countless students and postgraduates; and, still more, for over fifty years he has certainly earned the love, affection, and regard of countless of our colleagues." After being introduced by Mr. Green-Armytage and Prof. Hilda Lloyd, F.R.C.O.G., Professor Munro Kerr received his medal at the hands of Lord Webb-Johnson, president of the society, and concluded a happy occasion with a happy speech recalling old friends and former days.

"CITIES WITHOUT NOISE"

WHEN Elizabeth Barrett Browning complained that the world was "full of dreary noises" she can have had no inkling of the din which was destined to rend the air of the 20th century. We who live in the age of motor-cycles, pneumatic drills, and neighbours' wireless sets may well regret the passing of a time when noises were nothing worse than dreary. From excess of visual impressions we can shut our tired eyes; but our ears are never closed, and through them, day and night, we are exposed to noises against which we can offer no defence.

In addressing the Royal Society of Arts on this subject on Nov. 29, Lord Horder spoke as chairman of the Noise Abatement League, and as one who has played a prominent part in its labours. Its most tangible achievement before the war, he said, was the law on night silence in built-up areas, the effects of which were soon felt in daylight as well—and are still, as anyone who knew London twenty years ago can testify today. But the enthusiastic enemies of noise (who included H. G. Wells, A. P. Herbert, E. V. Lucas, and others of their calibre) had many irons in the fire: their sensitive ears could distinguish in the cacophony of the metropolitan orchestra such discordant instruments as the steel riveter, the ageing tramcar, the milk-cart, and the dustbin—and they fought them all.

The root of the matter, said Lord Horder, is spacing. If we spread ourselves over a sufficient area we cease to offend each other with our noises; if we gather too closely together the result is mutual discomfort: the happy mean is a problem for the architects, who have often shown their interest in this work. Noisy industries should be zoned, and high buildings alternate with lower ones; school playgrounds should not occupy confined spaces, and airports should be sited so that aircraft need not cross the city. Noises in the home also deserve attention, and some people might be prepared to pay a little more for insulated rooms: at present (as H. G. Wells once said) flat-dwellers are about as protected from sounds as they would be from sights if the walls were made of glass!

We must not imagine, Lord Horder continued, that all noise can be prevented; some, it seems, must be endured: the pneumatic drill, for instance, cannot be silenced without losing most of its power. All the more reason, then, to suppress such noises as we can. We tolerate the blended hum of street traffic, but the roar of an unsilenced motor accelerating down the street jolts our senses and affronts our sensibility. Science, it is true, has made us noisy, but it has also given us the weapons to subdue noise, if we will only use them. Those who want to make a really unholy din should do so in the proper place—in a park, perhaps, like Whipsnade, provided for their use. "The elimination of needless noise," Lord Horder concluded, "will never be achieved by Acts of Parliament alone—no, nor by science, however firmly we may harness it to this particular purpose. It can only come about by a general recognition of the fact that needless noise is a form of selfishness and lack of thought. Thus it is the man in the street who must, eventually, decide if we shall have 'Cities without Noise.' He must get it into his head that making a noise that is not necessary is a form of bad manners."

THE DURHAM DISPUTE

TRADE unionists commonly insist that their fellow-workers should join their union: by forcing employers to dismiss anyone who does not do so, they successfully apply the policy of the closed shop. The idea is that no worker ought to benefit from the efforts of a union unless he supports it by becoming a member; and this is certainly a tenable point of view. The situation is altogether different, as the *Times* points out,[1] when it is the employer who insists on membership of a union against the wishes not only of the workers but also of the union concerned. That is what the Durham County Council is doing: it has decided that all who work for it must be members of an approved trade union or professional organisation, and it intends to discharge anyone who does not produce evidence of membership. Though most of the 48 doctors working for the council are, no doubt, members of professional organisations, at least 44 of them have rightly decided that this demand —made without negotiation on the national level—is unacceptable: and the British Medical Association, so far from wishing to receive new members under the council's compulsion, is giving full aid to the objectors. The Royal College of Nursing and also the union which represents most of the 4000 teachers in County Durham are taking the same line; and the Government has unsympathetically hinted to the council that if dismissal of teachers and doctors leads to a breakdown of its medical and educational services, central grants towards these services will no longer be payable. The council has a good record and its members are no doubt acting from sincere conviction, but, as often happens when people's loyalties are narrow, it is managing to do a great deal of harm.

Prof. E. D. ADRIAN, O.M., F.R.C.P., has been elected president of the Royal Society in succession to Sir Robert Robinson, who retires after five years in office.

Through his work at the Home Office as an expert on drugs and factory legislation, Sir MALCOLM DELEVINGNE was brought into contact with many members of the medical profession. He represented the British Government at international conferences on labour regulation and on the control of opium. In 1931 he was chairman of the supervisory body for the limitation of manufacture of dangerous drugs. When he retired from the Civil Service in 1932 he was nominated by the Privy Council as a member of the council of the Pharmaceutical Society. In 1936 he was chairman of the Interdepartmental Committee on the Rehabilitation of People Injured by Accidents, and three years later he presided over the Emergency Committee for the Nursing Profession. He died on Nov. 30 at the age of 82.

1. *Times*, Dec. 1, p. 7.

Special Articles

THE PATTERN OF MASS RADIOGRAPHY*

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THE following figures, based on the work done by mass-radiography units in Region 1 during 1949, give some idea of the cost of case-finding by this method. Four units were in action, three of them completely mobile and independent, and they took between them 97,250 miniature films during the year. When all the expenses of running the units are taken into account the average cost per miniature film works out at 4*s.* 6*d.* Cases sent for further investigation, as a result of suspicious findings in the miniature film, numbered 6247, or 6·4% of the total examined. Large films taken of these cases worked out at a cost of £3 8*s.* 10*d.* each.

The incidence-rate of pulmonary tuberculosis discovered by mass radiography seldom exceeds 2%. Using the figure of 4*s.* 6*d.* as the cost of a miniature film it is possible to calculate the cost of discovery of a single active case of pulmonary tuberculosis at different incidence-rates, as follows:

Incidence-rate %	*Cost per case discovered* £ *s.*
0·35	64 10
0·4	56 5
0·5	45 0
1·0	22 10
1·5	14 17
2·0	11 5

These would be the costs in an average survey; but it is possible to find extreme examples where the cost per case discovered is much higher, as in the following:

Over a period of 2½ months an area with an adult population of 53,790 was surveyed. The total number who volunteered for examination was 2315, or 0·04% of the population. Of these, 34 (1·5% of the number examined) were referred to the clinic for further examination, and 9 cases of pulmonary tuberculosis were found among them; but 7 of these were known already to the clinic. Only 4 were active cases, and 2 of these were already on the register; so the survey revealed 2 new active cases which had been unknown before. The cost of the survey was £1264, giving a cost per single examination of 10*s.* 6*d.*; the cost per patient referred to the clinic was £37, and the cost per newly discovered case of active tuberculosis £632.

*Based on a communication to the Tuberculosis Association on Nov. 24.

TABLE I—COST ANALYSIS OF CASES EXAMINED BY UNIT "N" IN 1949

Type of survey	No. examined A	No. referred to clinic B	New active cases found C
1. (*a*) Routine surveys of factories, &c. Combined with: (*b*) Open sessions to general public (volunteers)	23,173	167 (0·72% of A)	43 (25% of B 0·18% of A)
Cost per case discovered: £109			
2. (*a*) Cases sent by local doctors (*b*) Cases sent by chest clinics (including contacts)	1985 (8% of grand total)	117 (5·8% of A)	47 (40% of B 2·36% of A)
Cost per case discovered: £8 4*s.* 10*d.*			
3. Grand total of 1 and 2..	25,158	284 (1·1% of A)	90 (31·7% of B 0·35% of A)
Cost per case discovered: £54 7*s.*			

Table I compares the discovery-rates (and their cost) in routine surveys, in factories and elsewhere, with the discovery-rates in surveys where the cases were selected as suspicious by doctors or chest clinics. It will be seen that the cost per case discovered is £8 4*s.* 10*d.* where suspected cases only are examined, as against £109 when unselected populations are surveyed. In this particular survey the average cost per miniature film worked out at 3*s.* 10*d.*

For comparison, the figures from another unit (unit "D") may be considered. In this unit the overhead expenses were somewhat higher than those of unit "N," the cost per miniature film in 1949 working out at 4*s.* 9*d.* Unit "D" had an average discovery-rate for all cases of 0·67%, the cost per active case discovered being £35 12*s.* At sessions open to the general public the discovery-rate was 1%, and the cost per active case found £23 15*s.*

TABLE II—ANALYSIS OF RESULTS WITH DIFFERENT GROUPS OF PEOPLE EXAMINED IN NEWCASTLE IN 1949 (UNIT "N")

Group examined	Referred to clinic or kept under observation D	Estimated discovery-rate (active cases) % of total E	E as %age of D
1. Routine surveys of factories, stores, offices, &c.	0·5–2·0	0·12–0·5	25
2. School-children	0·0–1·0	0·0–0·25	25
3. Sessions open to general public (volunteers) ..	2·5	1·0	40
4. Referred by doctors and clinics; contacts	6·0	2·4	40

It will be seen from table I that the discovery-rate, as might be expected, was lower in routine surveys and open sessions than in selected cases sent by doctors or clinics. Table II, which gives the discovery-rates of unit "N" with four different groups, emphasises this point. When large numbers of supposedly healthy people are examined (as in routine surveys) the discovery-rate is low. At open sessions for the public it is somewhat higher because those who are anxious about their health are more likely to attend than others, and the group is therefore self-selected. Among people referred by doctors and clinics, the discovery-rate is naturally still higher. Table II shows not only that the discovery-rate was higher in groups 3 and 4 (the selected groups) but that a higher proportion of those kept under observation or referred to the clinic from these groups turned out to have tuberculosis than was the case with groups 1 and 2.

SOME FACTORS AFFECTING RESPONSE

Table III shows one of the weaknesses of unselected surveys: in five large factories the discovery-rate fell as the response fell. (Only one factory (factory A) lies outside this pattern; possibly there was contact infection, or some other special cause, to account for this discrepancy.) Bradbury [1] made a similar observation in 1948.

Response to an offer of mass-radiography examination varies, among other things, with the way the offer is made. If candidates are asked to attend if they wish (to contract in) the response is always poorer than if they are asked to say they will not attend (to contract out). Thus Sheffield unit found that with the contracting-

1. Bradbury, F. C. S. *Lancet*, 1948, ii, 293.

in system the response was 52–78%, while with the contracting-out system it was 74–84%. In other words, people do not care to say they are unwilling. On the other hand, even the contracting-out system may get a poor response if other factors interfere; thus of all the pregnant women attending antenatal clinics in Newcastle who were booked for radiography (contracting-out system) only 60% attended. They will bring their children to the welfare clinics, because they get good advice and vitamin supplements; but they are less ready to interrupt their daily chores to go and be investigated for a disease they have no reason to think they have acquired.

LIMITATIONS OF MASS RADIOGRAPHY

The contribution of mass radiography to case-discovery is on the whole modest. Of all the new cases on the register of a big urban chest clinic in 1949, only 18·5% had been discovered by this method; and in a random sample of the population in a sanatorium, only 33 (20%) of 162 men had been found by mass radiography. It is worth noting that of these 33, no less than 14—nearly half—had been picked out by mass radiography shortly after joining the Forces. In a random sample of 145 patients in the same sanatorium in 1947, the proportion picked up by mass radiography was only 11%. In another sanatorium, in 1949, 15 out of 104 women, and 11 out of 70 men had been found in this way (15% in both cases); but again nearly half of the men so discovered had been picked up in the Forces.

In any case mass radiography of the total population on a voluntary basis cannot even be attempted. The units and personnel at our disposal cannot deal with more than a small fraction of the adult population. One unit can manage 25,000–30,000 miniature films a year. In Region 1, with a population of over 2,700,000, five units are now operating. Average samples from a rural district and a large town indicate that 72·5% of the people in the region are aged 15 or more, and the adult population can therefore be reckoned as 2,110,000. The five units

TABLE III—RESULTS OF SURVEYS CARRIED OUT ON THE PREMISES OF FIVE LARGE FACTORIES

Factory	Attended %	Suspected %	Discovery-rate* %
A	60	2·2	0·55
B	75	1·8	0·45
C	60	1·47	0·37
D	53	1·4	0·35
E	37	1·1	0·25

*Discovery-rates reckoned as 25% of the cases referred to the clinic or kept under observation (of table I).

can deal in a year with only 150,000 people, or 7%, of the adult population of the region.

SUGGESTED USE OF MASS RADIOGRAPHY

In this region it is intended that routine surveys should be made in hazardous industries, especially dusty occupations like mining, sand-blasting, and steel-dressing; in industries and factories known to have an unusually high incidence of tuberculosis, such as tobacco and clothing factories, especially those employing young women; and in any factory or workshop in which an unusual proportion of employees are known to have developed tuberculosis.

In addition, it is proposed that there shall be quarterly sessions at every main centre of population, at which the following groups would be regularly examined:

1. All school-leavers, and any other school-child referred by the school medical officer or the family doctor.
2. Teachers, school kitchen-staff, and all others in regular contact with children (e.g., kindergarten and nursery school staff, and staff of welfare clinics).
3. All young people of both sexes about to enter the Forces. (This could be arranged in collaboration with the Ministry of Labour and National Service.)
4. Prospective candidates for employment, at the request of their firm or employing body (e.g., the Civil Service).
5. Women attending antenatal clinics.
6. Chronic sick; and all suspects, with symptoms, sent by family doctors, factory doctors, or medical officers of health.
7. Patients referred from chest clinics.
8. Contacts, for regular examination and follow-up. (This would be arranged on behalf of, and in collaboration with, the chest clinics.)
9. Volunteers from the general population who wish to be examined.

I believe that by keeping to these groups we could use mass radiography much more effectively and economically than we are doing at present.

My thanks are due to Dr. F. L. Wollaston, Dr. W. H. Dickinson, and the organising secretaries of the Durham and Newcastle Unit, and to the staff of the Newcastle Regional Hospital Board, who kindly supplied the material on which this paper is base.

MINIATURE RADIOGRAPHY WITH 4 × 5 INCH CUT FILM

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MINIATURE radiography had been under consideration for many years before the late war. D'Abreu (1945) has described his own earlier work in France and Brazil, and Bentley and Leitner (1940) were also experimenting in this country; but it was the war which provided the urgent spur to more rapid development of techniques. Trail (1942), Trail et al. (1944), and Brooks (1944a) were the leaders of progress in the British Services, and when the U.S.A. came into the war there was a wide demand in America for routine chest radiography before enlistment. The purposes of miniature radiography in both countries were essentially the same—to avoid the intake of tuberculous people into the Services, and by routine examination of Service personnel to detect cases of pulmonary tuberculosis as early as possible.

After the war, development was directed towards the survey of civilian populations, and once again the emphasis was on quantity and on speed of operation; individuality was not considered important. In a report to the Medical Research Council, Clark et al. (1945) considered the relative merits of 35 mm. film and the 4 × 5 in. stereoscopic films which had proved so popular in the U.S.A., and they decided in favour of the smaller film. It was generally agreed that in skilled hands the technical results were equally good, and for civilian mass radiography the 35 mm. film "had the added advantages of mobility of apparatus, larger numbers of examinations in a shorter time, and much more rapid processing and interpretation." (loc. sit. p. 2.) There is also the advantage of compactness in storage with 35 mm.

These factors are important for *mass* miniature radiography; quite different considerations arise when miniature radiography is to be a part of clinical and preventive medicine, divorced from the urgency and routine of a mass survey. In Britain only 35 mm. roll film has so far been obtainable, and all attention has been focused on mass surveys, but the technical efficiency has developed to such a high standard that we should now consider the use of miniature photo-

fluorography for general radiological purposes in hospitals and clinics.

The 4 × 5 in. cut film has been widely used throughout the U.S.A. and Canada but is almost unknown here. My experience in London is based on 25,000 X-ray films taken for the Ontario Immigration Department in 1948–49. In my view this size of film possesses such outstanding advantages that it should be the film of choice for further development throughout the British Isles. Except for survey work, the 4 × 5 in. cut film is preferable to roll film for photofluorography for many reasons, and it also has many advantages over full-size film for clinical purposes. It is, however, first necessary to be confident of the technical quality of the film.

COMPARISON OF RESULTS

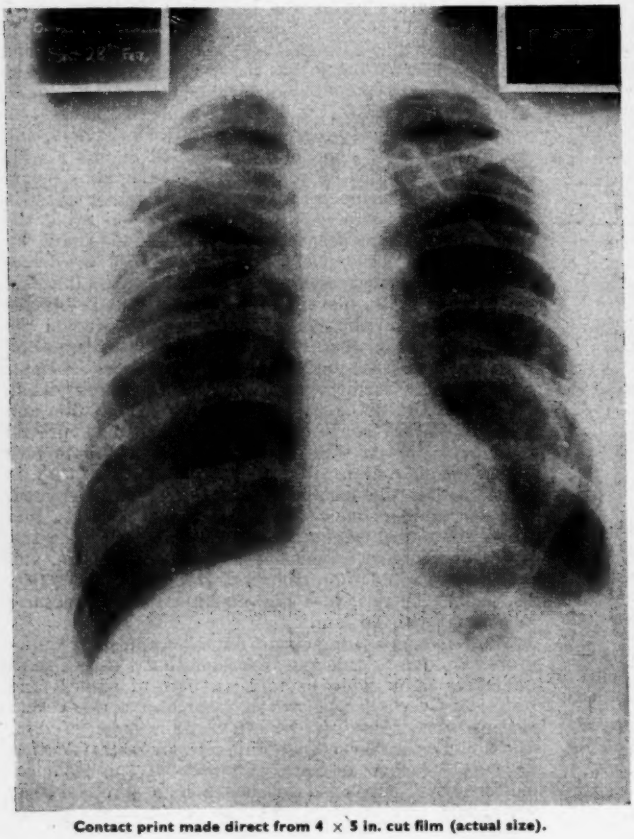
Hilleboe and Morgan (1945a) studied and compared the results with 14 × 17 in. celluloid film and the various miniature photofluorographic films—e.g., 4 × 5 in. cut film and 70 mm. and 35 mm. roll film. They tested these films for resolving power, detail, contrast coefficient, and relative sharpness, and in each case the 4 × 5 in. film was found to be inferior only to the full-size celluloid film and was superior to the smaller types of roll film. They held the same view as was expressed in the M.R.C. report (Clark et al. 1945)—that the 35 mm. roll film was most suitable for mass surveys—but they considered that the 4 × 5 in. cut film was preferable for small numbers. Although they used both single and stereoscopic 4 × 5 in. films, the advantage of the latter was "insignificantly small . . . and of little value" (Hilleboe and Morgan 1945b), but might increase if small films were developed for diagnostic purposes.

This preference for the 4 × 5 in. cut film has been emphasised by many workers—e.g., Clark (1942), de Lorimier (1942), Cranch (1943), Havlicek and Gill (1941), and Brooks (1944b). Tice (1946) surveyed more than 1700 civilians by both 70 mm. and 4 × 5 in. films, and his comment is directly relevant to the consideration of future development: "In the 70 mm. film we sacrifice specialisation for speed: in the 4 × 5 in. film we reverse the process and stress individualisation."

Those who have experience of 35 mm. mass miniature radiography in this country know that the results show a high degree of accuracy compared with full-size films; reports from U.S.A. and Canada confirm that in skilled hands the 4 × 5 in. film is of even better quality. Fralick et al. (1947) report 98·3% accuracy at the Gage Clinic, Toronto, and Plunkett et al. (1941) confirm that the 4 × 5 in. film gives greater detail. My own experience supports this view. In the accompanying illustration a contact print made direct from one of these negatives shows the actual size of the film but cannot show the high quality of reproduction attained.

ADVANTAGES OF 4 × 5 IN. CUT FILM

If it is accepted that the technical standard is adequate, this film has two very valuable advantages over full-size film—economy and convenience for storage. Compared with the miniature roll films it has the great advantage of rapid individual processing so that a film, can be taken and examined at the same session, and each patient's films can be kept together in one envelope with his case-notes. The film therefore combines many of the advantages of full-size and miniature material, and if it were introduced into general X-ray work it would prove most useful.



Contact print made direct from 4 × 5 in. cut film (actual size).

Economy.—Each film costs about 4*d.* compared with 2*s.* 8*d.* for each 15 × 12 in. film. For fifty exposures the saving is therefore about £5, and a busy department could easily save £1000 a year by using this miniature size for routine work and for follow-up of cases. Its use need not be confined to chest work, since any case in which the patient can be radiographed erect could be controlled by this method.

Individual films allow records to be kept together with the case-notes.

Speed of processing enables the miniature film to be read at the same session; this is essential for chest clinics and routine follow-up of out-patients.

Storage and Reference.—The 4 × 5 in. films can be kept with the notes or in separate storage rooms. The space occupied is less than a tenth of that occupied by full-size films, and by storing in boxes of 100 films reference is made easier. 1000 full-size films weigh about 90 lb. and occupy 4 c. ft., whereas 1000 4 × 5 in. films weigh about 9 lb. and occupy $^1/_8$ c. ft. A series of films are easily handled for comparison of progress.

Viewing by Direct Vision.—Enlarging or projection is not necessary, and the wet film can be viewed directly against a window or a viewing box. Clark and Poulsson (1941) have shown that accuracy in reading this size of film is easily acquired.

Reproductions or Extra Copies.—Extra negatives can easily be made at little cost, and they should be a routine on discharge of a patient. Reports can be accompanied by an actual X-ray picture instead of an inaccurate and vague attempt at a drawing. Prints can easily be made by direct contact. Lantern slides require an intermediate negative on fine-grain film, the technique of which is simple and within the capability of any X-ray department, but 4 × 5 in. films can be projected directly in a lantern.

Teaching.—These films are very convenient for circulating among a small audience, and for students to copy, or have printed, for personal records.

Marking.—Miniature films should automatically have the name, date, and unit included on them, thereby avoiding dark-room confusion and saving subsequent laborious clerical work. The incorporation of a photo-electric timer ensures uniformity of quality, and allows comparatively inexperienced staff to attain standard results.

CLINICAL USE

Sanatorium and Thoracic Units.—Initial diagnosis requires full-size films, but much of the subsequent control can be done with 4 × 5 in. film. Pneumothorax control would be simplified, since it would be no extravagance for junior physicians to keep a permanent record of screening appearances. All follow-up records and investigation of contacts can be done on small film.

General Hospitals.—Many proposals have been made for routine chest examination of outpatients, and in Canada the 4 × 5 in. film is widely used for this purpose. It would not be necessary to process all of these at once, except for a chest clinic, and in most cases a report could be added to outpatient notes. The film would be available at subsequent visits if required. Other purposes to which this type of film could be put in hospitals are the routine examination of staff and the examination of tuberculosis contacts.

Public-health Work.—Emphasis has recently been laid on the desirability of routine chest radiographs of immigrants. This is already obligatory for U.S.A. and Canada, and the speed and simplicity of miniature cut film has been described elsewhere (Clarke 1950).

Non-thoracic Conditions.—The use of miniature photofluorography need not be confined to chest conditions. I have used it to locate foreign bodies in the hand and forearm, and for injuries of the upper limb and similar conditions, and have found that it is thereby easy to obtain a convenient and accurate record and to achieve considerable economy in cost of film. Experience might well reveal many other examples in which the use of this material would be both beneficial and economical.

EQUIPMENT

The apparatus used by the Ontario Immigration Department in London was a Newton Victor set KX12, designed for full-size films, 70 mm. camera, and 4 × 5 in. cut film. That set is not available in this country.

What is required is the stand, screen, tunnel, lens, and cassette holder to operate in conjunction with the usual hospital X-ray tube, or with a separate tube for that purpose. The mounting and base-plate of the tunnel should be designed to take either a roll-film camera or 4 × 5 in. cut film, so that the more convenient unit may be used for each specific job.

It may be possible to modify the present standard 35 mm. set to take the necessary lens for 4 × 5 in. film: if not, the separate stand must be produced.

In the past the difficulty has been the larger lens necessary and the slightly more cumbersome equipment. If miniature radiography is to develop for general clinical use, and not only for mass survey work, British firms must produce the lens and develop this type of set, and film of the necessary quality must be available in this country. Then, and only then, will it be possible for all hospitals and clinics to appreciate the great value of this technique.

SUMMARY

Miniature radiography need not be confined to mass survey work; it could play an important part in general clinical medicine.

For this purpose the following conditions must be met: (1) individual negatives are necessary (roll film is impractical); (2) rapid processing must be possible, so that the X-ray film can be read at the same session; (3) the film must be large enough to be read without projection or special apparatus; and (4) the detail must be accurate enough to allow a clinical opinion to be formed; occasional control by full-size film may be desirable, but is not essential.

Experience with more than 25,000 films has shown that the 4 × 5 in. cut film fulfils these conditions, and offers advantages over other types in economy, convenience, and accuracy.

British firms should supply the equipment needed for the wider development of this technique.

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DISTRIBUTION OF CHLORAMPHENICOL

ANNOUNCEMENT BY THE MINISTRY OF HEALTH

Owing to improvement in supplies, chloramphenicol ('Chloromycetin') will be generally available on prescription from Dec. 11. The following provisional lists are intended as a guide to practitioners in prescribing this antibiotic.

There are certain infections (list 1 below) in the treatment of which chloramphenicol is more effective than any of the therapeutic agents at present generally available. Apart from these there is a variety of infective conditions (list 2 below) in which the value of treatment is less certain; preliminary trials both in this country and abroad have given variable results, and further experience is needed before chloramphenicol can be recommended as routine treatment in these diseases. In certain diseases (list 3 below) there is no satisfactory evidence that chloramphenicol has any therapeutic value.

1. *Infections in which the therapeutic value of chloramphenicol is superior to that of sulphonamides or penicillin:*
   - Typhoid and paratyphoid fevers (excepting carriers).
   - Brucellosis (undulant fever).
   - Rickettsial diseases (i.e., typhus, scrub-typhus, Q fever).
   - Psittacosis.
   - Lymphogranuloma inguinale.
   - Atypical (virus) pneumonias.
   - Urinary tract infections resistant to sulphonamides and penicillin. (These include infections due to resistant strains of *B. coli*, *B. proteus*, *Ps. pyocyanea*, and *Str. fæcalis*. Sensitivity of the organism to chloramphenicol should be determined.)

2. *Infections in which therapeutic benefit from chloramphenicol has been reported but not fully substantiated:*
   - Whooping-cough.
   - Salmonella food-poisoning.
   - *H. influenzæ* meningitis.

3. *Infections in which there is no satisfactory evidence of the therapeutic value of chloramphenicol:*

Influenza.
Common cold.
Poliomyelitis and polioencephalitis.
Tuberculosis.
Syphilis.
Ulcerative colitis.

Chloramphenicol is probably effective in a number of pyogenic infections, such as bacterial pneumonias, gonorrhœa, and peritonitis, but it is doubtful whether it is as effective as penicillin or sulphonamides. In bacterial endocarditis due to organisms which are penicillin-resistant, chloramphenicol is probably inferior to a combination of streptomycin and penicillin. An exception to this is bacterial endocarditis due to penicillin-resistant *Staph. pyogenes*; for this, as for any severe penicillin-resistant staphylococcal infection, 'Aureomycin' is the antibiotic of choice.

It should be noted that chloramphenicol in the powdered form has an extremely bitter taste. It is not, therefore, easily administered to young children who will not swallow capsules.

MEDICINE AND THE 1951 FESTIVAL OF BRITAIN

LAURENCE DOPSON

ON the South Bank exhibition site, the pavilions are now taking recognisable shape in preparation for the opening of the Festival next May. The site is divided by the arches of Hungerford Bridge, but the two sequences of buildings thus formed are to tell different parts of the same story. The theme of the whole is Britain's contribution to civilisation, past, present, and future, particularly as seen in science, technology, and industrial design. Within that theme the exhibits in the up-stream section, west of Hungerford Bridge, will be concerned with The Land, or the environment which has influenced and in turn been influenced by British contributions. The exhibits in the down-stream sequence between Hungerford Bridge and Waterloo Bridge, will deal with The People—i.e., with what the British people have achieved. Medical contributions take their place where appropriate in both sequences. Thus British contributions to tropical medicine, biology, and some aspects of physiology are to be included in the Dome of Discovery, which will be devoted to British exploration and discovery in all fields—terrestial, oceanic, geological, physical. The more personal aspects, such as the work of Harvey and others on the circulation of the blood, are featured in a pavilion in the down-stream sequence where the general theme of health is illustrated.

A council has been formed to advise the Festival Organisation on the proper representation of British achievements in science and technology, and one of the members is Dr. H. P. Himsworth, Secretary of the Medical Research Council. A medical sciences advisory panel has also been set up, and Sir Sheldon Dudley, F.R.S., has acted as medical adviser. The executive officer for the health section is Mr. N. B. Clayton.

HEALTH PAVILION

In the Health Pavilion which stands partly under Waterloo Bridge, the theme will be the health of the individual and the health of the community. As he goes in, the visitor will find an introductory section describing the body and its functions. For instance, the explanation of the nervous system given here, and the contributions of such men as Sherrington, will help the lay visitor to understand the later section on neurology. Similarly, the section on physiology of the blood which begins with Harvey's discovery of the circulation, will provide a link to succeeding sections.

In the introductory section, the general description of nutrition will prepare the visitor for the next part, on the maintenance of health, where, as an example of applied nutrition, will be illustrated community feeding as developed in Britain in the late war. The public-health services, in which the British sanitary reformers led the way, will mainly be shown in relation to clean water-supply and sanitation, but there will also be a small exhibit on air hygiene and the prevention of atmospheric pollution. In this way the two aspects of health are exemplified—the individual by good diet, the community by public-health measures. Mass immunisation, biological standardisation, and vital statistics will also be illustrated.

Turning from health to sickness, the visitor will learn something of Britain's contribution to therapeutics, to neurology, and cardiology, and this section will lead him naturally to the next—the introduction to surgery. Here he will be shown how modern surgery depends on asepsis and anæsthesia, based on the work of such men as Lister and Simpson. Blood-transfusion and the work of the National Blood Transfusion Service will also be explained, and the visitor will learn something of the part that Britain has played in developing thoracic, orthopædic, and plastic surgery. He will be shown how burns are treated today according to British practice in asepsis, and this will link back through the danger of infection, to air hygiene. Through the exhibition there will be stimulating cross-references of this kind, to show how the story of health and disease is interrelated.

The survey of surgery will be interrupted to tell the story of nursing. Here the Nightingale tradition of treating the patient as a person and of concern for the comfort of the patient, which is characteristic of British nursing, will be emphasised.

The importance of environment to health is further demonstrated in the section on homes, which will emphasise the family unit, and on school buildings.

OTHER SCIENTIFIC EXHIBITIONS

As a corollary to the South Bank exhibition, an exhibition of science will be held on the ground floor and basement of what will afterwards be the new west wing of the Science Museum in South Kensington. Here, as at the South Bank exhibition, modern methods of presentation will be used. The exhibition will not be arranged in conventional museum fashion, with small specimens laid out on benches and in glass cases. Written explanations will be cut to a minimum, and the displays will be largely visual and three-dimensional. The main theme will be the spirit of scientific discovery and recent advances in knowledge of the structure of matter and fundamental processes. There will, for example, be models showing the structure of sugars, fats, and proteins, and models and photographs to demonstrate cellular formation and differentiation: a final section will be devoted to current research. Some medical exhibits, inappropriate to the South Bank exhibition will be found here. Cancer research, for instance, is included in the exhibit showing the structure of matter.

In the specially converted aircraft carrier *Campania*, a small travelling version of the South Bank exhibition, including the health section, will tour the ports and seaside towns of the United Kingdom.

All these exhibitions are designed for the intelligent lay public. The specialist will also be catered for by the appropriate learned body. The Royal Society of Medicine, for instance, is arranging for visiting doctors a series of addresses appropriate to the Festival theme during the summer of 1951, and medical museums in London will probably be staging special exhibitions. The British Association has arranged that its 1951 meeting in Edinburgh shall form part of the Festival.

GENERAL MEDICAL COUNCIL

SESSION NOV. 28–DEC. 2

After hearing the President's address, reported last week, the council considered a heavy calendar of penal business.

Disciplinary Cases

The council did not direct the Registrar to erase from the Register the name of *Mrs. Ethel Grundy Toward*, registered as of Brookside, Durham Road, Birtley, co. Durham, M.B. Durh. (1925), who appeared for postponed judgment.

John William Paterson Collier, registered as of Holm Lea, Church Road, Yapton, Sussex, M.B. Edin. (1922), was charged with having called at or about 12.20 A.M. on April 9, 1949, at the house of Gladys May Hitchman to attend an infant, when under the influence of alcohol to such an extent that his professional judgment was impaired. Information in the case was received from the Minister of Health. Mr. Harold Brown, instructed by the solicitors to the council, presented the facts, and Dr. Collier was represented by Mr. Gerald Howard, K.C., M.P., and Mr. J. MacGregor, instructed by Messrs. Hempsons, on behalf of the Medical and Dental Defence Union of Scotland.

Consideration of this case had been postponed at the May sitting owing to the illness of the district nurse who was to have given evidence. Opening the case at the present session, Mr. Brown stated that the nurse now refused to give evidence.

Mr. Herbert Hitchman said that he and his wife were on the list of Dr. Collier. On April 7, 1949, his wife was delivered of a male child. Dr. Collier was in attendance. On the evening of April 8, his wife and he noticed that the baby looked "very sick." Soon afterwards the district nurse examined the baby, and asked Mr. Hitchman to telephone to the doctor. After several calls he was told at 11.30 P.M. that the doctor had been contacted at Bognor and was on his way. Dr. Collier arrived about 12.15 A.M. and, said witness, "he looked very the worse for drink." After Dr. Collier left, the nurse told witness to telephone Dr. Collier's partner, who came about 1 A.M. The baby was then dead. Mr. Hitchman afterwards communicated with the executive council for East Sussex. Witness agreed that Dr. Collier still attended his family, and that Dr. Collier normally had a fairly high colour and was abrupt in his talking and movements.

Mrs. Gladys May Hitchman, examined, said that when Dr. Collier came, after midnight, he staggered into the room, and flopped on to the bed. "Just by looking at him you could tell he had been drinking." The way he examined the baby did not seem right. He tapped the baby's chest. Asked what Dr. Collier said after the examination, witness replied: "He said it was perfectly all right." He wiped his hand round the nurse's face and said: "That's all right, nursee."

The first witness for the respondent was his host at the party at Bognor. There was nothing in Dr. Collier's behaviour, the witness said, to suggest he was drunk. When he was called away, he came to witness to apologise because he had had an urgent call and had to go. Two other guests said that there was nothing about Dr. Collier on this evening to suggest he was the worse for drink.

Dr. Collier, in the witness-box, said he saw the child at birth and on the following morning, when he made a full examination. Mrs. Hickman, whose first baby had died, was extremely worried about this infant, who was premature. He made a careful examination not because the child appeared ill but because he seemed weak; he found nothing clinically wrong. In the evening the baby was blue and breathless, but apparently no more ill than when he saw him in the morning. Describing his method of examining the chest, he said he used the method of alternate percussion on fingers and the chest which Sir Robert Philip had taught him to use in young children. When he heard that the child had died he was not surprised, because it was a sickly, premature baby. He had no recollection of rubbing his hand over the nurse's face. He gave the cause of death on the death certificate as congenital atelectasis. Cross-examined, he said that he was not surprised at the baby's death, but he did not expect it to be sudden. He did not tell anybody in the house that it might be imminent. He told the nurse that he could find nothing wrong with the baby. He did not know that the nurse had sent for his partner until he had heard the evidence. In reply to a member of the council, who asked why he gave a death certificate if he could not find anything wrong on clinical examination, Dr. Collier replied that he gave a post-mortem differential diagnosis.

The council found the facts alleged against Dr. Collier not proved to their satisfaction.

AN "UNEXPECTED VERDICT"

A doctor was charged with having been convicted in 1949 of committing an act of gross indecency with a 14-year-old boy, for which he was sentenced to 12 months' imprisonment. Mr. Winterbotham presented the facts and the doctor was represented by Mr. Harold Brown, instructed by Messrs. Freeman & Son.

During the hearing Mr. Brown recalled that it was held in the Spackman case that the council could not go behind a conviction; but this was not an ordinary case. As the Lord Chief Justice had said, in judgment in the Court of Criminal Appeal, the trial judge would have preferred a verdict of acquittal. Giving sentence he had said: "I do not agree with that verdict and I do not understand it." Mr. Brown submitted that even if the council could not go behind the conviction, if they were presented merely with the bald fact of the conviction, they would be incompletely armed with the relevant facts. If, for instance, in a trial there were gross irregularities and an appeal was not put forward, he did not think the council would be debarred from going into those circumstances. He submitted that the surrounding circumstances were a matter for the consideration of the council.

The family of the boy, Mr. Brown said, had continued as patients of the doctor for months afterwards and neither parent said a word to him. As the judge had said: "Can you believe the parents believed that boy's story?" When the matter came before the Court of Appeal the Lord Chief Justice thought it so important that he ordered it be heard before a full court of five judges. The appeal was dismissed on the grounds that the court could not interfere with the verdict of the jury.

The boy had not been treated by the doctor, though he was on the doctor's list. The point might arise on some occasion whether being on a doctor's list constituted a professional relationship; Mr. Brown submitted that there must be something more.

When the doctor gave evidence, Mr. Brown said he wished to ask him whether he was in fact guilty, but the legal assessor advised the council to rule against the question. Mr. Brown then asked if the doctor had at all times maintained his innocence. "I have," he replied. Since his release he had resumed practice in the same district, and now had 1600 patients on his list. The boy had not been on his list, but on his partner's. Evidence of character was given by a colleague who had been a fellow-student, and by two patients.

The council found that the doctor had been convicted of the misdemeanour, but did not direct the Registrar to erase his name from the register.

The council directed the Registrar to erase the name of *Illtyd Gwyn Williams*, registered as of Ravenscourt, Tynewydd Road, Barry, Glamorganshire, M.B. Edin. (1923). He was found to have had intercourse with a woman (the complainant) when he stood in professional relationship with her.

ALLEGED CANVASSING

Eugene Wlodzimierz Collis, registered as of 183, Woodstock Road, Oxford, M.D. Vilno (1937), appeared before the council on two charges of canvassing. Dr. Collis had bought the house, but not the practice, of Dr. Harper, of Oldbury.

The first charge alleged that he canvassed patients of the practice of Dr. G. G. Cooke, of Oldbury, and the second alleged that he canvassed patients of the practice of Dr. Jack Lockley, Dr. Reginald Morris Howson, and Dr. Hazem Barrada. The complainants in the case were Dr. Howson and Dr. Barrada.

Mr. Benjamin Sadler gave evidence that last December he wanted glasses. At the time he was registered with Dr. Harper and he went to Dr. Harper's surgery, where he saw Dr. Collis. Witness admitted that he went to that house because that was where Dr. Harper lived.

Sir Sydney Smith: "Did the doctor say that you could not get glasses from him unless your wife also was put on his list?"—"No."

Mr. Benjamin Griffiths said that he went to Dr. Harper's surgery when he had flu; he had been a patient of Dr. Harper's all his life. He found Dr. Collis there, who examined him and said he was the new doctor. Witness asked if he could be put on Dr. Collis's list, and he said: "Yes, certainly." He did not know until he got home that his family were

registered with Dr. Barrada. His wife went up to Dr. Collis and told him, and Dr. Collis said: "That's all right. I've bought Dr. Harper's business, and it's only right I should have you."

Mrs. Cutler said that she was a patient of Dr. Barrada. Her husband had been a patient of Dr. Harper, and she went to Dr. Harper's surgery and asked Dr. Collis to call. Dr. Collis said: "Why not have one doctor?" She thought he wanted her on his list. When she later gave him only her husband's card, he said: "Just the one?" and she said: "Yes."

Mrs. Fletcher said that her baby was on the list of Dr. Barrada. Dr. Barrada said he could not circumcise the baby privately unless it was transferred to some other doctor's panel, and she arranged to have the child put on Dr. Collis's list. In reply to Sir Sydney Smith, witness said Dr. Collis did not ask her directly to have her name placed on his list, but he said that if they were satisfied with the way he had treated baby, and she and her husband wanted to change, they would have to sign the form.

Dr. Collis, in evidence, said that he put an advertisement in the *British Medical Journal*, as a result of which he purchased Dr. Harper's house. Nearby was the house of Dr. Cooke, who was carrying on the practice. Subsequently Dr. Cooke told him that he wanted to retire and that his partner saw no objection to Dr. Collis taking over the practice. Witness had a conversation with the chairman of the executive council, who said he saw no reason why he should not succeed to Dr. Cooke's practice, but that he was to treat this conversation as confidential and should not say anything of it to Dr. Cooke or his partner. Dr. Collis formally applied to take over the practice and received a letter from the clerk to the executive council, as a result of which he engaged an assistant and got a car. Mr. Griffiths told the witness he was a patient of Dr. Harper's, and was Dr. Collis Dr. Harper's successor? Witness said that he was not. Mr. Griffiths said he wanted to be on Dr. Collis's panel. Asked by his counsel whether he ever tried to persuade Mrs. Cutler to come on his list, Dr. Collis replied: "On the contrary. She asked me several times, and several times I sent her back to her own doctor."

In answer to Sir Henry Cohen, Dr. Collis said that, having started from scratch, he now had a list of 1800 patients. Oldbury was a small place. When Sir Henry asked if it was likely, in view of the proximity of the other practitioners, that it was from those practices that his patients would have come in some numbers, Dr. Collis replied: "Yes, it is likely."

After deliberation in camera the president announced that the council had found the facts not proved to their satisfaction.

"GESTAPO METHODS"

Florence Joseph O'Driscoll, registered as of 43, Moss Lane Liverpool, M.B. N.U.I. (1928), appeared before the council charged with infamous conduct in that

"On May 31, 1950, you were so far under the influence of drink that you were incapable of properly carrying out your professional duties towards your patients who were waiting to consult you at your surgery, at 43, Moss Lane, Liverpool, and in particular were incapable of rendering any proper and necessary treatment to Mrs. Doreen Shone, one of the said patients."

Information in the case was received from the Chief Constable of Liverpool. Dr. O'Driscoll was represented by Mr. D. Braben. Mr. Howard, K.C., M.P., and Mr. MacGregor, instructed by the council's solicitors, appeared to state the facts. Mr. Howard, opening the case, said that Mrs. Shone was not present, and the only evidence would be that of two police officers.

Inspector James Smale said that on May 31, in response to a telephone message, he and Detective Sergeant Alfred Metcalf went to 43, Moss Lane, Liverpool. The door was answered by the doctor's brother, who said the doctor was seeing no more patients. Witness explained that they wanted to see the doctor privately. He stopped the brother from closing the door, and the doctor came to the surgery door. He was leaning on the casing to support himself. When witness told the doctor of the complaint Dr. O'Driscoll said: "Let's be having some names." When the inspector replied that he was not in a position to give the name, the doctor said something of which witness caught the word "Gestapo." His breath "smelt of spirits." The inspector said he would like to see his brother. Dr. O'Driscoll said his brother was not in. The officers went upstairs and found the brother standing on the landing. Told that he should see no more patients, Dr. O'Driscoll said: "I will always take good advice." He asked the two men in the waiting-room to leave, and then the officers left. Cross-examined, witness agreed that his notes were sketchy. Asked if it was right that he or the sergeant looked through the waiting-room window, witness replied it would have been impossible to do so. He agreed that he asked the doctor his age, whether he was the tenant of the house, whether he was married. The doctor's answers were all "thought over." He did not ask the doctor how many drinks he had had: "I could see he had had too many." Inspector Smale agreed, in reply to the Legal Assessor, that if no complaint about dangerous drugs had been received, he had no right to go into the house. Witness told Sir Henry Cohen that the doctor had seemed "bemused." Sir Henry pointed out that he asked for the name of the complainant, which was reasonable.

Detective Sergeant Metcalf, in evidence, said the doctor adopted an "aggressive manner." He produced his pencil "with a flourish" and said: "Let's be having some names." He considered the doctor was under the influence of drink and was unfit to deal with patients. Cross-examined, witness said the inspector did look into the waiting-room window before they went into the house. Asked about what right he had to be in the house, witness agreed that they were on "rather delicate ground," but "We were never told we couldn't come in."

Dr. O'Driscoll, in evidence, said that Mrs. Shone was a panel patient to whom he was giving antenatal treatment. When she came to his surgery on the night in question, he called her Mrs. Davenport in error; Mrs. Davenport was another patient, also pregnant, who lived at the same address. He apologised. Describing what happened when the police officers visited him, Dr. O'Driscoll said that when the detective sergeant suggested he should close the surgery he refused. When they said they wanted to see his brother, he called him, and getting no answer, said: "He has apparently gone out; you can look for yourself." He told the police he had had one drink of beer that day. He thought the officers had forced themselves into the house, and to justify themselves were going to make out the charge of drunkenness. In answer to Sir Henry Cohen, Dr. O'Driscoll said his surgery had been open from 5.30 to 7 P.M., and he had seen about a dozen patients. "Had you any complaints from those patients?"—"None whatever."

Mr. R. W. Varning, a school teacher, said he and another man were in the doctor's waiting-room, and he saw the plain-clothes man look into the window. The officers left before he did. There was no smell from the doctor, and there was nothing about him to indicate that he was not sober. He gave witness a prescription, which witness read without difficulty. Dr. Joseph Mackin gave evidence of having visited Dr. O'Driscoll on the same evening and having noted that he was perfectly sober. Dr. O'Driscoll's married stepdaughter also said that the doctor was quite sober.

Mr. Braben addressed the council on behalf of Dr. O'Driscoll, and Mr. Howard said he did not wish to reply. After consideration in camera for only about a minute, the President announced the council had found the facts alleged not proved to their satisfaction.

ADDICTION OFFENCES

Nigel Harold Maurice Russell Monro, registered as of 442, Nell Gwynn House, Sloane Avenue, London, S.W.3, M.R.C.S. (1936), was charged with having been fined £20 at Ashford magistrates' court in 1947 for offences concerning failure to enter dangerous drugs in a register, with being fined for insulting behaviour and assaulting a police constable later in 1947 in London, with having been convicted on July 11, 1949, of being drunk and disorderly and assaulting a police constable, and of having been convicted at the Central Criminal Court in November, 1949, of occasioning bodily harm to Wendy Joan Monro, for which he was sentenced to twelve months' imprisonment. Mr. Winterbotham stated the facts of the cases, and said that the Home Office had withdrawn Dr. Monro's licence to obtain drugs. After deliberation in camera the President announced that the council had found the convictions proved, but in view of the testimonies from his patients they had decided to postpone judgment for two years.

Eric Leonard Neil Shoeten Sack, registered as of 64, Trinity Court, Gray's Inn Road, London, W.C.1, B.M. Oxfd.(1945), was

charged with having been convicted at the Tower Bridge magistrates' court on March 13, 1950, of receiving two suitcases knowing the same to have been stolen, for which he was find £20 and £10 10s. costs. The council's solicitor presented the facts, and the respondent was represented by Mr. N. Leigh Taylor, of Hempsons, solicitors, instructed by the Medical Defence Union.

In evidence, Dr. Sack said that to control nervousness and excitability he had been in the habit of taking 'Sodium amytal' at first 3 g. a day. On the day in question he took 24 g. He had visited the offices of the Medical Defence Union in the afternoon, and Dr. Robert Forbes, the secretary, gave evidence that he had made a note at the time of Dr. Sack's visit that his demeanour appeared to be that of someone under the influence of a drug: he was now quite different. Mrs. Sack said that her husband was now quite free from any influence of drugs, and a certificate from Dr. G. W. B. James, under whose care he was admitted to hospital for treatment after the conviction, was read.

After consideration in camera, the President said the council found the conviction proved, but had decided to postpone judgment for a year.

William Melrose, registered as of 15, St. Paul's Square, Liverpool, L.R.C.P.E. (1924), was charged with having been convicted at Liverpool City magistrates' court on July 14, 1950, of being found drunk, for which he was fined 10s. After consideration in camera, the president announced that the council found the conviction proved. This was not the first time respondent had appeared before them, and they were bound to take a serious view of a further conviction. Judgment was postponed for two years.

RESTORATIONS

The president announced that the Registrar had been directed to restore to the Register the names of *Gerald Donagh Flatley*, *Henry Charles Coutts Hackney*, and *William Hamilton*.

Business of Council

The President introduced the report of the Pharmacopœia Committee, of which he was appointed chairman in place of the late Professor Dilling. The British Pharmacopœia Commission, 1948–53, had, he said, unanimously recommended that the main titles of the monographs in the 1953 *British Pharmacopœia* should be stated in English.

> "It is proposed that Latin titles should not be coined for new monographs. It is also proposed to alter the sequence of the monographs by placing preparations such as tablets, injections, and tinctures immediately after the parent substance, instead of grouping the preparations on a pharmaceutical basis, such as Tabellæ, Injectiones, and Tincturæ."

In view of these proposed changes, the Commission thought that the monographs in the *Addendum* dealing with preparations of human blood should appear as a separate section with titles in English. "It is felt that no useful purpose would be served by inventing Latin titles for these monographs."

An extra sitting of the council, to consider disciplinary and other business, including educational, will be held in February, 1951.

Disabilities

55. FRACTURE OF THE SPINE

It all came of trying to help with the chores. I had just finished dressing and was going down to the kitchen when my foot slipped on the top of four steps. Involuntarily I jerked my whole body forward, and in the split second that I was suspended in mid-air I felt a terrific rending and crunching sensation right across my middle. As I collapsed in a heap at the bottom I knew beyond the slightest question that I had fractured my spine. I was frightened to death. Could I move my toes? Well—I knew I'd got to face the music sooner or later, and it had better be now. I tried to waggle them. They waggled. That was one of the best moments of my life. By this time my son was enjoying a good laugh at my expense and my wife had arrived on the scene.

"I've done it this time," I said. "I've fractured my spine. But it's all right. I think you'd better call the ambulance." Then I passed out.

When I came to, I was cold and drenched with sweat. The doctor from next door was bending over me; he went, gladly enough, to invite an orthopædic colleague to come round. The others gave me a hot-water bottle and heaped rugs on me. My resuscitation was fairly rapid, and with it came a curious sense of well-being so that I felt inclined to get up and welcome my visitor at the door. But I lay where I was, wondering whether I ought to be turned on my face or my back. The ambulance was already waiting when the orthopædic surgeon arrived. "Never mind," he said, "we'll soon get you to the hospital and see what you've done." There was no room in the little lobby where I lay for the ambulance men to do a textbook lift. They heaved me up, a little unceremoniously I thought, and turned me on my back on to a stretcher with a rolled-up blanket across its middle. But as long as I was conscious and my back muscles were all in a good state of spasm it probably didn't matter.

At the hospital I was taken straight to the X-ray department where they were waiting to receive me. The radiographer wasn't worried by fractured spines. "Now turn on your side," she said as cheerfully as if I had nothing worse than a pint of bismuth inside me; and like a lamb I turned. Soon afterwards the radiologist appeared from the dark-room. "You're quite right," he said. "Its the body of D12 that's gone; but it's quite a good position." And with that I was taken to the ward and put to bed with a hard pillow under my middle.

Hours passed. My exultation was over, and I was beginning to feel under the weather again. I thought of my days as a casualty officer when I had reduced all manner of fractures, fixed the limbs in cumbersome splints, and sent the victims home without so much as an aspirin. My remorse grew on me. If only I'd done this before I had that job, how different my behaviour would have been; I'd have treated my patients and not only their fractures. Just then the medical superintendent came in. "Are you comfortable?" he asked. "Well, I suppose I am," I replied, "if you're using the word in the hospital sense." He took the hint, and in a few minutes a nurse came along and gave me an injection. The hours passed but I lost count of them, and at last the nurse came and gave me another injection and off I went to the plaster room. There I was arranged with my chin on one table and my shins on another while a trolley supported my middle. My torso was adorned with strips of felt, and when all was ready the surgeon said: "Now, I want you to hang on just like that when we take the trolley away." I dug my elbows into the front table, off went the trolley, bang went a slab of warm wet plaster into the small of my back, and in an instant three pairs of hands were bandaging, rubbing, and slapping plaster all round me. It all seemed to be over in an incredibly short time, and then I was helped to my feet and one of the girls trimmed me up and cut a window in the front. They took me back to the ward and left me to dry with an electric cradle over me.

What happened after that I never really knew. I remember vomiting from time to time—a difficult thing to do decently when you are lying flat and cannot move. In the intervals I felt I was cooking slowly; but for the greater part of the time I did not know what was going on, either because I fainted again or because I fell into a drugged stupor. But there was no stupor about me next morning. Indeed I was only too wide awake, and the next three days were a positive nightmare of a well-

known B.B.C. lady crooner, over-heating in the E.M.S. hut, and physical discomfort. To begin with I couldn't breathe. I began to realise what it must be like to have asthma; and to make matters worse I had developed a cough with tough plugs of mucus and couldn't get enough air into my chest. As if that wasn't enough my intestines seemed to have thrown in their hand and to be swelling out of all recognition. The night nurse had views on treatment. "What about some linctus," she said, "and a little mag. sulph.?" "I don't mind the linctus," I replied, "but I draw the line at mag. sulph. It isn't that my guts won't work: they can't; and it's no use being unkind to them." By the next night I was as tight as a drum but as pig-headed as ever.

The third day was the worst. It is true the shortness of breath was better; but my abdomen was sticking up out of its window in a most sinister way. I regarded it tenderly as a motorist would an inner tube beginning to bulge out of a worn cover, with no spare wheel and a mile to go home. When the night nurse came on duty I surrendered unconditionally. What use are theories in treatment? I spent a disturbed night, but next morning awoke completely deflated and for the first time in four days was able to face a meal.

A visitor the day before had said I looked "ghastly." Now things were different. I had only to lie in bed and enjoy being incapacitated. I settled back comfortably to make the most of it. But not for long. A young physiotherapist came into the ward and proceeded to put its occupants through their paces. I tried to avoid her eye, but it was no use. "Ha," she said "I see you're better. Time you began your exercises. You can come to the physiotherapy hut at 2.30." And I went. She was quite right; if I was to regain my muscular efficiency I'd got to work for it.

At the end of the week I went home. Trying to lead a normal life in a plaster case presented all sorts of unexpected difficulties. At first quite slight exertion brought back the difficulty of breathing almost as badly as before, and even concentrating on abdominal respiration did not help; but this trouble lasted no more than a month. The other disabilities were there as long as I was in the thing. If I sat down, my thighs pressed on the lower edge and levered the whole jacket up, so that if I didn't keep my head vertical the upper projection jabbed me in the Adam's apple. Reading and writing became difficult and so did eating, while drinking soup from a spoon was almost impossible. Do you realise how many times a day you go through the motions of picking something up from the floor? I never did till I found I couldn't do it. But I evolved a special technique of locating the object, putting the outside of my heel against it, doing a double knees-bend, and then feeling straight down with my fingers. Of course I couldn't bathe, but that was one of the lesser evils. What was worse was the difficulty of drying when I had got really hot inside my shell. In the end I found the solution in an electric hair-dryer. I would retract myself as far as possible within my case, blow hot air around till I was dry, and then finish off with a delightful draught of cold.

All this time I was keeping my muscles in trim by doing regular exercises at home, and three days a week in the hospital using the special apparatus there. Some of these exercises, such as lying across a bed with my heels held, bending down till my head touched the floor, and then coming up to the horizontal again, looked much more difficult than they really were. The only one I found at all exacting was walking along a 2 in. bar of wood raised a foot off the floor; I felt as if I was balancing on the parapet of a house. But what was most difficult of all was sustaining my interest in the ritual. Perhaps this is not so bad where there are a lot of people with the same disability so that the competitive element creeps in; but when you are alone there is often a strong inclination not to bother with it for once—and if I didn't bother once I knew I should be lost. I was determined to get better; and I was prompted by fear of what might happen if I didn't. "A good many people find it worse coming out of plaster than going in," the experts told me, "and it's because their muscles aren't equal to it." So I flogged away at the exercises and invented others of my own. As I sat at my desk, I developed the power of contracting my trunk muscles individually, feeling them press against the plaster as they came into action. In my imagination my umbilicus was a movable object; and I made it go round and round, first clockwise and then anticlockwise, like the tip of a minute hand.

By the end of the twelfth week either I was getting thinner or the plaster was stretching; anyway I was beginning to rattle about inside it like a nut in its shell. About the same time, too, I became aware of a constant gnawing pain through the middle of my right chest that made me want to free myself and have a good stretch. At last, at the end of another fortnight, the great day came and the plaster was cut off. I half expected to collapse like a jelly on the floor; but nothing of the sort happened. On the contrary, I never felt so firm and fit for action in my life. The other unexpected thing was that the pain in my chest grew worse for two or three days, after which it gradually disappeared. Today, nearly three years after the accident, I have a wedge-shaped vertebra, perfect function, and complete freedom from any unpleasant sequel.

Public Health

Poliomyelitis

IN England and Wales notifications of poliomyelitis during the week ended Nov. 25 were: paralytic 111 (111), non-paralytic 19 (39); total 130 (150). The figures for the previous week, compared with which there was a total decrease of 20, are in parentheses. Uncorrected notifications for the corresponding weeks in 1947 and 1949 totalled 145 and 193.

Total uncorrected notifications for 1950 to and including the week under review are 8251. The corresponding figures for 1947, 1948, 1949, are 8821, 2212, and 6327.

Smallpox not Confirmed

A coloured student resident in a hostel in Chelsea, London, was removed to Long Reach Smallpox Hospital via the Brook Hospital, Greenwich, on Nov. 28. Laboratory investigations and further clinical developments have now removed all suspicion of smallpox.

Infectious Diseases in England and Wales

Disease	Week ended Nov. 4	11	18	25*
Diphtheria	49	55	76	61
Dysentery	260	411	474	626
Encephalitis—				
Infective	7	1	2	4
Postinfectious	1	2	3	1
Food-poisoning	130	144	215	151
Measles, excluding rubella	7821	8857	10,139	11,343
Meningococcal infection	32	26	33	37
Ophthalmia neonatorum	35	26	38	45
Paratyphoid fever	5	3	1	7
Pneumonia, primary or influenzal	433	465	558	490
Poliomyelitis—				
Paralytic	149	161	111	111
Non-paralytic	57	64	39	19
Puerperal pyrexia and fever	59	82	67	48
Scarlet fever	1112	1206	1387	1483
Smallpox	..	..	..	..
Typhoid fever	..	3	5	3
Whooping-cough	3098	3725	4152	4334

*Not including late returns.

In England Now

A Running Commentary by Peripatetic Correspondents

MY friend the psychologist has just bought a radiogram. (No, no! I don't mean an X-ray film—a wireless-phonograph.) She may not be able to mend a fuse but she is *au fait* with the latest work on electronic brains, so she approached her new companion with more respect than many people would have given it. It had one of those automatic record-changers and she found it a little upsetting after her previous homely one with its broken handle and unpredictable clockwork. The music-click-whirr-plop-whirr-music sequence hinted at a considerable amount of thoughtful effort inside, and she used to sit trembling with anxiety after each side ended, wondering how long this dark-skinned monster would be content to crouch in its corner whirring, clicking, and plopping in the right order.

Last week the inevitable happened. The machine took a fancy to the beginning of the second movement of the Eroica. It played the passage through and then began again. The sad music boomed ominously round the flat. Then to her horror it began for the third time. What was she to do? Should she become a dominant mother-figure and whack the machine on its flank? Or perhaps stroke it and try to develop a transference? Eventually she decided to emulate Fabre with his wasp and let it go on for seventy-five (or was it a hundred and seventy-five?) times to see if it would learn. The fifth rendering saw her own nerves in no good shape, but being a good psychologist she clenched her teeth and carried on. Soon after this the machine got really obsessional and its needle stuck in a groove. Compulsive outbursts were obviously only a matter of time, so she packed a bag and spent the night at the hospital. Now she is in a sorry plight. She would like to phone her flat, but who—or what—might answer?

* * *

I know the answer to the flying saucer problem. It came to me when I read an article by Mr. Fred Hoyle saying that relativity would enable us to travel in a high-speed rocket for a month by rocket-time and return to find the earth several thousand years older by earth-time. Obviously the saucers do not come from another planet at all but from our own. Ages ago, when science had got a bit further on than we are now, some people set out in saucers for a month's pleasure cruise in space. Soon afterwards the people left behind blew themselves up with atom bombs. Then civilisation began again, and now the saucers have just got back. So far they haven't landed, but when they do get a good look at their children they will certainly beat it, at the speed of light, for another million years. So I have packed a suitcase and if I see a strange blue light in the sky I shall thumb a lift.

* * *

If *The Men* had been made by Ealing Studios there would perhaps be more laughs in it; and, paradoxically, it would be more moving. Somehow we have a better knack of putting across the semi-documentary film than the Americans. Stanley Kramer has set his picture in a genuine hospital for soldiers with paraplegia and has been scrupulous about the medical details. The film shows well the modern treatment of paraplegics, refers openly to their bladder and bowel troubles, and gives an energetic picture of reablement in the magnificently appointed gymnasium and swimming-bath. Extra power in the arms and torso is an essential preliminary to life in a wheel-chair, and these young men set about the job seriously—too seriously, the boys at Stoke Mandeville would say. The only time they looked really cheerful over it was in the swimming-bath, where they sailed round with their seats wedged into rubber-rings; the rest of the time—lifting larger and larger dumb-bells till they reached the sort usually reserved for strong-man acts—they were as solemn as prep-school boys in training for the sports. In contrast, the backchat in the wards had the genuine flavour of cheerful cynicism.

All-in-all, the film deserves high marks on the technical aspect; but it broke down lamentably at the love-interest level. The American girl, it would have us believe, gazes at her paraplegic boy-friend with a look of steadfast sorrow, pursues him with guilt-provoking fidelity, and waits for the wedding-night to tell him it is all going to be too much for her, while mamma, though she has had a year or two to get used to the prospect, makes her boy's first visit home a misery by crying audibly in the next room every night. As a rule the paraplegic's fiancée and family have so little hope at the start that they hail every sign of their man's growing independence as marvellous; and when he leaves hospital able to live an almost ordinary life they are as proud as if he were a winner in the Olympic Games. But in any case a paraplegic who is out to pull his weight is not a liability but an asset in the home, like the head of any other family.

* * *

I regret to say that I have been up before the Bench on an alleged technical offence, though fortunately for my local reputation the case was dismissed. While waiting in the yard of the court-house I had ample opportunity to study the cross-section of humanity found in such places, of which I now formed a part. It was a bumper day for the court, because a gang which had plagued the county for a year or more, stealing chickens and anything else it could get, had been rounded up. It did not altogether surprise me when a man who lived next door to my home proved to be a member of this gang, and he greeted me warmly as we waited for our names to be called. What the B.B.C. would term the "quickies" were disposed of first, and I emerged a free man. During the afternoon rumours began to circulate about the fate of the gang and the sentences its members were receiving, and I wondered how many months would elapse before my neighbour was again working in his garden. I need not have worried, for late in the evening, when I was taking a walk, my neighbour hailed me, only slightly subdued, from his gateway. "That was a bad do today, doctor," he remarked, "they caught me for fifty quid." How should one reply on such an occasion? To sympathise would be to condone the offence; to say he was lucky not to be in the county gaol would hardly be tactful. I could only agree lamely that it *had* been something of a do, from all accounts; whereupon, fortunately, he launched into full details and was satisfied with my yeses and noes.

* * *

The other morning I stumbled over an up-turned potty as I hurried through the front door, late, as usual, for work. It struck me at the time as a little unusual, but being, like most registrars with family responsibilities, distracted by the cares of this life, I gave it no further thought until the same thing happened on the second and again on the third mornings. By then I thought I must take the only likely offender—to wit, my son (aged just four)—severely to task. Guarded questioning brought only the soft answer and a smooth turning of the conversation to the type of train now to be seen across the field, and a firmer approach resulted in sulkiness, tears, and, no doubt, feelings of guilt. I became worried. Was this, I asked myself, the EGO or the ID? What ghastly and be-it-ever-so-slightly deep-seated complexes were at the root of this highly abnormal behaviour? Field observation, I told myself, was the first step, and next day I was up early to gather more information. What I had failed to observe was that he is 6 inches too short to reach the Yale lock on the inner door, but the potty made all the difference. "Aren't I a good boy to bring in the *Times*?" he observed.

* * *

In my country (*not* England now) the anæsthetists are taking the lead in the surgical departments. When our chief anæsthetist told a younger colleague the other day, "I have four surgeons working for me," he wasn't far wrong. Their apparatus is getting so big and complicated that it takes two or three anæsthetists to work one machine and there is hardly room for anything else in the theatre. Their latest whim is to give every patient continuous oxygen therapy for some days after operation. I have suggested that the patients might take their oxygen masks home with them to amuse the children.

Letters to the Editor

REGISTRARS

SIR,—Both the action of the Minister and the reaction which it has evoked appear to me to show a singular lack of realism and a lamentable failure to grasp fundamentals. The attempt is being made to staff the hospitals by adapting a system outmoded by the nationalisation and the phenomenal advance of medicine. Such an attempt is doomed to failure. You cannot put new wine into old bottles. Moreover, there is no surer way of getting into a muddle than by calling persons and things by their wrong names. "Consultant" originally meant one who gives a second opinion. Later it became a courtesy title for those who had retired from active hospital staffs. Now it is applied to nearly all who hold part-time or full-time permanent hospital appointments. Anæsthetists, for instance, have become "consultant anæsthetists," a term which does not make sense. The modern registrar performs few, if any, registrary functions, these having been assumed by the records officer; he is in reality a physician, surgeon, or specialist.

Before the war those who undertook the long and arduous climb to consultant rank did so with their eyes open. A great many gave it up at various stages, slipping quietly and with a good grace into general practice where their experience usually enabled them to build up a specialist practice on a less ambitious scale than they had originally hoped. The supply of aspirants was thus automatically adjusted, if not to national needs, at least to the amount of money which the community was prepared to pay. In other words, the number, and therefore the standard, was limited by the amount which could be earned in private practice. Although this factor has ceased to operate, the recollection of it persists, and inhibits clear thinking. Despite the budding-off of new specialties such as pædiatrics and thoracic surgery, the amount of general medical and surgical hospital work has enormously increased. Yet the number of general physicians and surgeons has not been increased, the burden of the extra work devolving upon the registrars.

In contrast to the registrars the consultants find themselves in clover. Formerly, as everyone knows, the young consultant faced a hard struggle for many years, eking out a livelihood by odd teaching jobs and depriving himself of holidays for fear of missing a patient. Now, from the word "go" he is completely relieved of financial anxiety. He has a permanent appointment at a substantial salary and unaffected by competition, six weeks' holiday with pay, sick-leave and study-leave on generous terms, and a pension at the end of it. He enjoys, too, the exceptional privilege of deciding for himself how much time he gives to the service.

Such wide disparity in pay and security is justified only if the consultants confine themselves to the difficult work, leaving the easier to the registrars. But this is just what does not happen. Registrars, though responsible to their chiefs and relying upon them for guidance in difficulty, carry out much of their work independently. In the absence of their chiefs on holiday they are in sole charge; at night and at weekends they perform operations which are quite as difficult as those performed by their chiefs during normal hours.

It is widely believed, both inside and outside the profession, that the whole of consultant work (using this term in its modern sense) requires unusual ability and an experience acquired only after many years of apprenticeship, and we are told that the requisite standard cannot be maintained unless there is always a large field from which to select. It is about time this bubble was pricked. Great experience and judgment certainly are required, but, under modern hospital conditions, only in a minority of cases. With all due respect I cannot see that these qualities are required in order to refer a patient for X-ray examination at the request of his doctor, a second to the dietitian for weight-reduction, or a third to the physiotherapist for the treatment of so-called fibrositis of the neck. Still less can I see that they are required for the strange new practice of writing to the doctor a lengthy and quite gratuitous account of the patient's symptoms—facts with which the doctor is perfectly familiar and which form the reason for his sending the patient. Yet this kind of work looms large in outpatient departments and is performed by consultants and registrars indiscriminately (incidentally keeping thousands of typists happily employed). Can it be seriously maintained that it calls for exceptional gifts or involves heavy responsibility?

Since the wholesale reference of patients to hospital is deemed necessary to a science-worshipping society, somebody has to do the work. The consultants could not cope with it even if they gave up private practice, which few of them would be prepared to do. They have come to rely on the registrars for the performance of work which is nominally theirs. Moreover it is owing to the provision of registrars that they have been enabled to continue private practice. They therefore cannot stand by and watch those who have served them so well thrown to the wolves. They cannot profit from an outrageous system whereby the State entices people into its service and keeps them on probation until the age of about 35 (half man's allotted span). Moreover, the State may well be compelled by circumstances to decree that private consultant practice is incompatible with employment in the service.

The solution therefore is perfectly clear. Permanent establishments should be increased until they are sufficient, and there should be a much closer approximation of pay, even if this means, as it inevitably must, a reduction in the salaries of existing consultants. In view of the heavy incidence of surtax, those who enjoy distinction awards will at least be consoled by the knowledge that they are handing their money over to their fellows instead of to the Chancellor of the Exchequer. Meaningless designations and obsolete concepts of status and dignity must be abandoned and, within the limits set by the national finances, work must be rewarded on the only rational basis—namely, the intellect and craftsmanship needed for its performance.

Cambridge. FFRANGCON ROBERTS.

SIR,—I have been instructed to report the resolutions of the Welsh Regional Registrars' Group at a meeting held in Cardiff on Nov. 25. The resolutions were passed unanimously by the 32 members present, amongst whom were representatives of most parts of the region.

While the Ministry's circular [1] was condemned as being a totally unsatisfactory solution of the registrar problem, certain features were singled out as being particularly unacceptable.

The instruction in paragraph 9 (ii) that registrar and senior-registrar appointments be reviewed annually and where necessary terminated on the implementation of the reduced establishments, was regarded as representing flagrant breach of contract where appointment has already been made for 2 or 3 years in accordance with the terms and conditions of service.

The recommendations in paragraph 11 (*b*) that general practitioners "with registrar experience" be appointed as part-time clinical assistants were unanimously condemned as completely unacceptable.

The appointment of ex-registrars as part-time clinical assistants while engaging in general practice near their hospital work would be as unacceptable to the previously established general practitioners in the area as to the displaced registrars. It would lead to further attenuation of

1. See *Lancet*, Nov. 11, 1950, p. 537.

the local pool for remuneration of general practitioners in addition to creating ill-feeling between different groups of the profession, particularly where the ex-registrars appointed as clinical assistants would be seeing their colleagues' cases referred to hospital.

The flooding of the general-practitioner market with 1100 redundant registrars will, of course, be most convenient for the Ministry, which is at present engaged in opposing general-practitioner claims for an increase in the central fund for payment of capitation fees. No proposal has been put forward for increasing this fund from the money saved by dismissing these 1100 registrars.

The suggestion (in paragraph 12 of the circular) that boards should send a polite letter to dismissed registrars was regarded as merely adding insult to injury.

The desirability of the necessary cuts in registrar establishments taking place gradually was realised, and it was pointed out that the extension of senior-registrar posts for a fourth, fifth, or even a sixth and subsequent years would not only alleviate individual hardship but would reduce the annual recruitment and retirement of registrars and so allow the temporary maintenance of establishments above the proposed level without further perpetuating the disproportion between registrar and consultant vacancies. As an example, the 28 senior registrars calculated as indicated for the Welsh region on the basis of 3-year tenure could be 36 or 37 on a 4-year average tenure, and this increase would particularly benefit the non-teaching hospitals, whose work and patients will undoubtedly suffer if the proposed radical cut is introduced.

G. R. VENNING
Acting Secretary,
Cardiff. Welsh Regional Registrars' Group.

SIR,—There is a strong argument for reducing the number of trainee specialists while there are few consultant posts falling vacant each year. On the other hand, the Ministry of Health encouraged numbers of us to take up specialist training with the promise of an increase in the number of consultant posts under the National Health Service; and it was recently reiterated in Parliament that the country was far short of the numbers required. That these posts will not be created for some time has been apparent for the past year at least; yet without prior consultation with any representative medical body, the Ministry have swung the axe.

Laments by the small number of registrars are less likely to be heard than those by general practitioners or consultants; and we are looking to these groups for support, if only against the methods used, which might later be applied to any other branch of the profession.

ANOTHER REGISTRAR.

SIR,—The answer to the problem of the registrars is simple and widely agreed upon amongst the profession. The number of consultant posts must be rapidly increased to the figure which the Minister has previously held to be necessary. Registrars must take action to ensure that: (1) the memorandum shall be frozen until discussions with the profession have taken place, and (2) the Minister explains why he is unwilling to solve the problem by making more consultant posts. Is it because of economic or political considerations? Or is it, as some would believe, due to the resistance of the present consultants?

If the Minister can give a valid reason for his attitude, then registrars must coöperate with him in solving the problems that will face them. But surely they must know this reason first. And until then they should not discuss with him the alternative methods of solving the difficulty.

Middlesex Hospital, London, W.1. CECIL MCIVER.

SIR,—May I suggest that one solution to the registrar problem is the reintroduction in surgery and medicine, and an increase in other specialties, of the S.H.M.O. grade? I know that this grade has been violently opposed in the past, but then we looked forward to an expansion in the consultant services and presumed there would be an increasing number of openings for the top grade of registrar. This suggestion, or that of "Senior Registrar" (Nov. 18) that senior registrars should be retained for 6 years, would seem to me to have the merit of least disrupting the hospital services. It would be disappointing to many but would not give the sense of despair that the present cut has produced.

I am completely in favour of the G.P. being more in the hospital "swim," but cannot see part-time clinical assistants with conflicting calls on their time offering the service given by the present registrars.

REGISTRAR.

SIR,—We registrars, suggest immediate collective action of registrars for the amendment of the Ministry of Health edict, if only to avert our financial ruin, irrespective of the wider questions of increasing the number of consultant posts and maintaining adequate hospital staffs.

We suggest two basic demands to achieve this: (1) security of tenure of non-teaching-hospital appointments above that as senior houseman, such as existed in the municipal hospital services; and (2) constructive proposals for those leaving the hospital service, to replace the impracticable suggestions about the Armed Forces and the Colonies contained in paragraph 12 of the Ministry's circular.

Such security of tenure will mean:

(*a*) That non-teaching hospitals will not be robbed of a vital segment of their medical staffs; a cut is bound to be at their expense as it appears unlikely that registrar appointments in teaching hospitals will be cut by half.

(*b*) That individuals not advancing to consultant status will drop out (as, indeed, they always did) at their own convenience; and consultants will be produced by competition, experience, and qualifications instead of by any rigid and uniform time-table system. Recurring artificial crises of superfluous registrars would not then arise. At present the situation can be compared to a factory where the foremen, not reaching the board of directors in two years, are automatically thrown out of the industry.

The constructive proposals for those leaving the hospital service might include facilitated entry into general practice, training courses without loss of pay—essential for those who have spent years in a specialty—preference for practices where part-time work in the specialty would be available, and no sudden termination of contracts now.

We urge the most vigorous action of all registrars by personal interviews with M.P.s, through their own groups of the B.M.A., and, if possible, by a deputation to the Minister of Health.

H. BOURNE, P. W. GRANT, N. C. CONNELL, I. MURRAY DALE, J. A. HALLINAN, J. F. HUDSON, J. A. IRWIN, J. B. JEFFRIES, N. B. JETMALANI
Registrars.

Netherne Hospital, Coulsdon, Surrey.

FIELD WORK FOR STUDENTS

SIR,—In your leading article last week, you mention some of the measures taken to bring medical students into contact with general practice. Students from Guy's Hospital have been visiting the homes of patients attending the general practice of the Bermondsey Medical Mission as part of their course in social medicine. The staff of the mission have found that students and patients alike enjoy these visits. My own experience in taking part in this experiment has convinced me that much benefit could result to both parties by an extension of this method.

TREVOR H. HOWELL
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SALICYLATE AS AN ANTICOAGULANT

SIR,—I was interested to see that at a recent meeting of the British Cardiac Society Dr. J. L. Lovibond, who had investigated the value of salicylate in the treatment of coronary thrombosis, reported that this drug is an unpleasant but safe anticoagulant for domiciliary use. He found that few patients were able to tolerate sodium salicylate or calcium aspirin ('Disprin') in the massive daily dosage of 200 grains for many days. This is not surprising; for sodium salicylate is notoriously more prone to induce toxic symptoms than aspirin and has the serious disadvantage of increasing the sodium content of the body; and calcium aspirin has nothing to recommend it in the treatment of thrombosis, as a substitute for aspirin, except its solubility.

I am still using aspirin in suspension as a routine treatment for phlebitis, pulmonary embolism, and coronary thrombosis, in doses of 20 grains four-hourly—i.e., 160 grains daily. When the instruction to give the mixture with milk or other food is strictly adhered to, the patient seldom complains of any discomfort referable to the drug. There is a big difference between giving 20 grains of aspirin powder on an empty stomach and 20 grains in suspension with food; but it is surprising how many apparently intelligent people do not appreciate this. It would be a great pity if a safe and simple remedy of proven value in the treatment of thrombotic diseases were to be discarded for the lack of a little common sense.

Torquay. PAUL GIBSON.

MYXŒDEMA FROM RESORCINOL OINTMENT APPLIED TO LEG ULCERS

SIR,—In their article of May 6, Dr. Bull and Dr. Fraser reported myxœdema in three elderly women who had for a long time received applications of resorcinol ointment for varicose ulcers. In each case sections of the thyroid gland showed signs of hyperactivity characteristic of the action of an antithyroid drug. In the same issue Dr. Doniach and Dr. Fraser confirmed the antithyroid activity of resorcinol in animals and found that thiouracil does not enhance this activity.

We therefore thought it desirable to study the histological response of the thyroid in animals after administration of resorcinol.

For this purpose seven rabbits (six bucks and one doe) were used, and five bucks served as controls. All of them belonged to pure strains (Moravia Black, Silverblack, Chinchinella), were 5–8 months old, and weighed 1220–2300 g. They were kept in the usual wire cages and were fed on hay, bread, and oats.

Resorcinol was administered subcutaneously as a 1% solution in 0·9% saline solution; 50 mg. per kg. body-weight was given for 4 days, and 75 mg. for 15 days. The total amount of resorcinol administered was therefore 1325 mg. per kg. The absolute amount administered during the 3 weeks of the experiment varied from 1596 mg. to 3096 mg. according to the weight of the animal. The drug was tolerated fairly well; by the end of the experiment the animals had lost about 5% of their weight. They were then killed by air embolism. The thyroids of these animals showed no signs of enlargement (their weight averaged 95 mg.), nor any change in their tender consistence or in their colour compared with those of the controls. Likewise the histological picture did not differ from that in the control animals, apart from changes that were within normal limits.

To observe the effect of methyl thiouracil and resorcinol administered together, the former was given subcutaneously to seven rabbits in doses of 100 mg. per kg. body-weight in *N*/10 solution of sodium hydroxide six times weekly for 9 weeks (total amount 9040–11,105 mg.). From the 7th week four of the seven animals received resorcinol subcutaneously as in the previous experiment. All seven rabbits were bucks, of pure strain, kept under the same conditions and killed in the same way as in the previous series. The thyroids of all seven animals were greatly enlarged; their weight averaged 735 mg. and they had a fleshy red colour and firmer consistence. Histological examination revealed in each case the well-known effect of methyl-thiouracil, and this effect was in no way modified by the resorcinol.

Thus the administration of resorcinol does not change the histological structure of the thyroid in rabbits, nor does it influence the effect of methyl-thiouracil administered simultaneously.

FR. KLEIN
V. OTTIS
J. VELVART.

Department of Pathology, Slovak University, Bratislava, Czechoslovakia.

SIMPLE TEST FOR PREGNANCY

SIR,—For the past ten years I have been using a simple clinical test for pregnancy.

It consists in injecting 5 mg. progesterone on three alternate days. The absence of withdrawal bleeding is a positive sign of pregnancy. If the amenorrhœa is due to any other cause, bleeding occurs in about 5 days. Cases of obstruction—congenital or acquired—and of absence of the uterus can be easily excluded by bimanual examination. I have had no chance to use the test in cases of hydatidiform mole; but I expect that it would be positive.

Suhag, Upper Egypt. M. EL MISHAD.

TUBERCLE BACILLI IN THE C.S.F.

SIR,—In your annotation of Aug. 19 you remark that "many factors concerned in the pathogenesis of tuberculous meningitis are still imperfectly understood."

We have learnt that tubercle bacilli may be found in the cerebrospinal fluid (C.S.F.) without clinical or pathological evidence of meningitis. We do not know why the presence of tubercle bacilli in the C.S.F. is not always followed by tuberculous meningitis, or why in some cases the meningitis is only circumscribed. Rich [1] suggested that very numerous bacilli are necessary to produce meningitis. Schwarz [2] has often seen cases where caseous masses have broken down into the subarachnoid space without a violent reaction, even in the presence of numerous acid-fast bacilli. It seems that the number of tubercle bacilli is not the deciding factor in every case. Koch [3] suggested that tubercle bacilli can multiply in the C.S.F. It might be reasonable even to assume that phagocytosis may take place when the organism gets into the C.S.F., and the effectiveness of this could decide whether or not tuberculous meningitis will develop.

During treatment of miliary tuberculosis with streptomycin tubercle bacilli may be found in the C.S.F. while tuberculous meningitis is developing, without any clinical evidence. For this reason diagnostic lumbar puncture should be performed periodically on patients with miliary tuberculosis. In diagnosis C.S.F. sugar estimation can help in distinguishing tuberculous meningitis from a tuberculoma in the meninges or the brain. With each the protein level and the number of the cells is increased; but whereas in tuberculous meningitis the cells usually exceed 20 per c.mm.—usually they number 50–300, though they may exceed 1000—with tuberculoma the number remains under 20 per c.mm. In tuberculous meningitis the sugar content is low and continues to fall,[4] whereas in tuberculoma the sugar content is normal. Tuberculoma may or may not produce meningitis, so it is perhaps best to avoid the diagnosis of "serous tuberculous meningitis," suggested by Lincoln,[5] because this might give the patient or parents a false sense of security.

It is no surprise that we can detect tubercle bacilli in the C.S.F. of patients with tuberculous meningitis who have received intrathecal streptomycin and have been regarded as clinically cured. I have often found that when a child seemed to be "clinically cured," the cell and protein content of the C.S.F. decreased while the

1. Rich, A. R., McCordock, H. A. *Bull. Johns Hopk. Hosp.* 1933, **52**, 5.
2. Schwarz, J. *Amer. Rev. Tuberc.* 1948, **57**, 63.
3. Koch, O. *Beitr. Klin. Tuberk.* 1940, **94**, 183.
4. Steiner, B. J. *Jb. Kinderheilk.* 1923, **102**, 173.
5. Lincoln, E. M. *Amer. Rev. Tuberc.* 1947, **56**, 95.

sugar level remained low, showing that the tuberculous meningitis was still in an active stage.[6]

It was more difficult to interpret the cases—seen mainly before sufficient experience was gained with streptomycin therapy—where the cell and protein content were more or less increased and the sugar content was normal but potassium-permanganate reduction was produced within five minutes.[7] In my opinion, these cases are in the active stage. Here increased sugar content does not indicate healing; and it may be brought about in several ways, such as by the encephalitis, extensive tuberculomata in the brain, tuberculous abscesses, œdema cerebri, disturbance of regulation by the diencephalon, or disturbance of reabsorption of C.S.F. The strength of these enhancing factors outweighs the lowering influence of meningitis.[8]

There are two other interesting groups. In one tuberculous leptomeningitis is cured and the C.S.F. is normal, but cerebral tuberculosis is in an active stage. Avcyn and Ivanovszkaja [9] have found this condition in 6% of cases examined post mortem. Tubercle bacilli could easily break into the C.S.F. from the cerebral foci. On the other hand, the patient can be cured clinically, as well as by the criteria of C.S.F. cell, protein, and sugar content, and yet tubercle bacilli can be detected in the fluid. In Levinson's [10] opinion, in such cases no further streptomycin treatment is necessary.

Volcsok et al.[11] suggest that when tubercle bacilli are found in the C.S.F. of patients who have been treated with streptomycin for tuberculous meningitis, this treatment should be immediately recommenced even if the C.S.F. is entirely normal.

Bródy Children's Hospital, Budapest. BÉLA STEINER.

POTENTIATION OF SULPHONAMIDES

SIR,—I have read with interest the article by Professor Bigger and Mr. Ware, and also the annotation, in your issue of Sept. 30; and I agree completely with your remarks. It would be a pity if the widespread practical application of a potentiated form of the first broad-spectrum chemotherapeutic to have been evolved were hampered either by the untimely retirement of Professor Bigger or by the undivided attention now being given to the fermentatively produced antibiotics.

Goldberger,[12] who is attending surgeon to this hospital, was apparently able to convert the "bacteriofrenic activity" (to use Professor Bigger's term) of various sulphonamides to bacteriocidal effects, by the use of defined chemically pure substance the prototype of which was azochloramide. Further investigation by Goldberger and his associates indicated that most oxidising agents, whether or not they yielded molecular oxygen (we should now term them "delectronators"), potentiate sulphonamide derivatives. In the past four years this clinical laboratory discovery has been applied here in the management of wounds and wound infections, with what appear to me excellent results. By others perhaps the significance of these findings may not have been fully recognised, owing to the present-day reliance on fermentatively produced antibiotics (though in many respects these may be decidedly inferior for direct application to wounds).

From Dr. Goldberger's original study it is possible to infer a degree of ubiquity for the thermostable potentiator described by Dr. Bigger and Mr. Ware. This may prove to be a ferric porphyrin derived from cytochrome oxidases present in many biological materials; for though an enzymatic oxidase would be as vulnerable to heat as any protein the "hæm" prosthetic nucleus is relatively indestructible, and under appropriate conditions of pH and redox potential may be as effective an delectronator as the oxidising agents in the category first used for sulphonamide potentiation by Dr. Goldberger.

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CHEST PHYSICIANS AND TUBERCULOSIS

SIR,—There is a widespread tendency amongst chest physicians either to ignore some of the basic facts of tuberculosis, or else to refuse to face them. Perhaps it is because a modern chest physician is so occupied with therapy that he has little or no time for prophylaxis. This is a most serious matter in pulmonary tuberculosis, where prevention is much more important than cure.

The preventive efforts of chest physicians are limited today to a few large film or screening sessions, and periodic exhortations to general practitioners to forward cases that might have suspicious symptoms. It is true that some chest physicians with fluoroscopes do sometimes find active disease; but as a preventive measure their methods are as hopeful as trying to empty the Serpentine with a pint-pot. Indeed one might say that the preventive measures of chest physicians are like a man pouring water into a bucket, not with a hole in the bottom, but with no bottom at all.

The present tuberculosis service is a superstructure built on an insecure foundation—insecure because it is mainly ignorant of, and impotent to deal with, the large underground reservoir of infection. Unless this reservoir is drained there is, despite declining mortality, no hope for any major advance in the control of tuberculosis in the next five years. If this is doubted, appraisal of the facts might help. For instance, in a London population of 300,000 people, served by a well-organised chest clinic, at the present moment the number of undiagnosed active cases requiring treatment is more than twice the number of active cases seen by the chest physician in the whole year. At present we allow the stream to flow from the reservoir, and in time to grow into a veritable river.

It is high time that much greater attention was paid to the prophylaxis of pulmonary tuberculosis. The present practice of relying on symptoms for case-finding is inadequate, and it is to well-organised half-yearly routine radiography, on 35-mm. film, of all susceptible age-groups that we must look for help. The disadvantages of such a scheme are great, but not great enough to put it out of court. The advantages are so evident that it is unnecessary to list them.

No doubt I shall be severely taken to task for suggesting methods that would swamp the already insufficient tuberculosis beds; but, as Dr. Toussaint has shown in Willesden, there is great scope for the domiciliary management of tuberculosis. Much of the disease discovered by routine radiography could be treated by this means.

Laennec wrote in 1819, seven years before his death from pulmonary tuberculosis: "Small tubercles separated from one another by portions of healthy lung cannot be recognised. But at this period of their progress the health is commonly still good and the cough too slight to induce the patient to consult a medical man." Here Laennec clearly stated the whole problem of early diagnosis and the case for routine radiography. Laennec had to rely on symptoms and the stethoscope for his case-finding. We do not. We have radiography and the laboratory. But whereas Laennec was able fully to exploit the stethoscope in his short life-time, we have not yet so used routine radiography. Today there are many chest physicians who make pleas for the early diagnosis

6. Steiner, B. *Lancet*, 1950, i, 466.
7. Ferencz, P. *Orv. Hetil*, 1928, **72**, 73.
8. Steiner, B. *Acta Oto-Laryng., Stockh.* 1949, **37**, 381.
9. Avcyn, A. P., Ivanovszkaja, T. E. *Nevropat Psikhiat*, 1948, **17**, 24.
10. Levinson, A. *Amer. J. Dis. Child.* 1949, **77**, 709.
11. Volcsok, Sz., Makovszkaja, G. G., Pevzner, A. E. *Probl. Tuberk.* 1949, i, 45.
12. Goldberger, H. A. *Amer. J. Surg.* 1942, **56**, 353.

of pulmonary tuberculosis and yet still rely mainly on symptoms. Early diagnosis is pre-eminently a radiographic problem.

THOMAS PAXON
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London, W.9.

DEOXYCORTONE AND ASCORBIC ACID

SIR,—Lewin and Wassén[1] recently reported the treatment of rheumatoid arthritis with deoxycortone and ascorbic acid. Thereafter, some early reports[2] were hopeful; but latterly the effect has been recorded as slight or nil.[3]

At this hospital 20 cases of rheumatoid arthritis, affecting the peripheral joints, have received this treatment. In several cases the arthritis was associated with other lesions: in one recurrent inoperable carcinoma of the bladder; in another severe secondary amyloidosis with renal and hepatic involvement; in 3 mild essential hypertension; in 2 generalised scleroderma (in one of these luetic aortitis with hypertension was also present); and in another chronic asymptomatic lymphatic leukæmia.

All patients received a daily intramuscular injection of 5 mg. of deoxycortone ('Percorten' in oil), followed within five minutes by 1 g. of ascorbic acid (aqueous solution) intravenously. Before treatment was instituted, each patient was thoroughly examined and his history was carefully elicited. Affected joints were radiographed, and a complete blood-count and erythrocyte-sedimentation rate (Westergren method), plasma-cholesterol and serum-protein estimations were done before and after therapy. Weight and blood-pressure were measured daily, and the patient examined for œdema and pulmonary râles.

EFFECT OF TREATMENT WITH DEOXYCORTONE AND ASCORBIC ACID IN 20 CASES OF RHEUMATOID ARTHRITIS.

Case no.	Sex	Age	Severity: Gross, with deformities	Severity: Gross, without deformities	Severity: Moderate	Duration (years)	X-ray changes	E.S.R.	Treatment (days)	Improvement
*1	M	40	..	..	+	2/12	Nil	V. rapid	8	Mod.
2	M	58	+	..	..	20	Marked	V. rapid	8	Mod.
3	F	61	+	..	..	6	Marked	V. rapid	7	Min.
*4	F	58	..	..	+	2	Min.	Normal	7	Min.
5	F	44	+	..	..	9	Marked	Sl. rise	7	Nil
6	F	60	+	..	..	4	Marked	Rapid	7	Nil
7	F	58	..	+	..	3	None	V. rapid	8	Nil
8	F	52	..	+	..	7	Mod.	V. rapid	8	Nil
*9	F	55	..	..	+	2 1/2	Min.	Sl. rise	7	Nil
*10	M	52	..	..	+	3	Min.	Rapid	7	Nil
11	F	38	+	..	..	5	Marked	V. rapid	7	Nil
*12	F	50	..	+	..	1 1/2	None	Rapid	4	Nil
13	F	30	+	..	..	5	Mod.	Rapid	1	Mod.
14	F	40	+	..	..	6	Mod.	Rapid	1	Nil
*15	M	33	..	..	+	3	Min.	Sl. rise	1	Nil
16	F	34	+	..	..	9	Marked	V. rapid	1	Nil
17	M	55	..	+	..	6	Marked	Rapid	2	Nil
18	F	60	..	+	..	3	Mod.	Sl. rise	3	Nil
19	M	54	+	..	..	19	Marked	Sl. rise	2	Nil
*†20	M	65	..	..	+	4	..	V. rapid	8	Nil

* Radiographic changes negligible or absent; "rheumatoid-like" arthritis.
† Death from acute pulmonary œdema.

Of 12 inpatients (cases 1–12 in the accompanying table), 4 reported some relief of symptoms, 3 reported slight relief equivalent to that which may be expected from rest in hospital, and 5 were unaffected. Of 8 outpatients, 1 showed moderate improvement; the remainder were unaffected.

In no case did the E.S.R. fall; nor was any change in the chemical composition of the blood detected. No patient reported the exhilarating effect recorded by Lewin and Wassén. Observations of the blood-pressure in 3 patients with hypertension on admission showed that the levels fell to normal under treatment; but in one patient the pressure rose, while in another the onset of fatal pulmonary œdema may have been precipitated by the treatment.

CASE 20.—This patient, a woman, aged 65, had arthritis, scleroderma, hypertension, and luetic aortitis. She received, as an inpatient, 8 days of treatment, and on the 8th day suddenly developed acute pulmonary œdema followed rapidly by death. The sudden acute heart-failure may have been precipitated by deoxycortone, which is a pressor agent.

This treatment is not a cure for rheumatoid or rheumatoid-like arthritis.

Mount Sinai Hospital, New York City.
SELVAN DAVISON.

SIR,—We have administered these two substances to patients with the following disorders: rheumatoid arthritis (10), osteo-arthritis (3), ankylosing spondylitis (4), traumatic arthritis (2), acute sciatica (3), and acute (1) and subacute (1) rheumatic fever.

In the majority of cases 5 mg. deoxycortone acetate was injected intramuscularly, and within five minutes 1 g. ascorbic acid intravenously. In some cases both drugs were given intravenously, with apparently more rapid results. In 3 cases both drugs were given together intramuscularly from the same syringe, with no response at all; all 3 cases responded, however, when one of the two other methods was used. The results were as follows:

Rheumatoid Arthritis.—Of the 10 cases, 8 were in a phase of acute exacerbation, with fever, loss of weight, depression, and manifest vasomotor disturbances. In this group of acute cases, within two to six hours the pain was distinctly relieved and the range of movements much increased. Improvement was maintained on the average for twelve to twenty-four hours, and was again produced by repeating the treatment. With each repetition the duration of improvement increased, so that after the fourth day the injections were given only every two to three days. After 10 treatments, 7 patients had continuing relief though some pain returned; the 8th relapsed after two days; but a second course of 10 injections has produced a remission which has persisted for two months.

The other 2 cases were not benefited, but 1 responded to a second course after small doses of thyroid and œstrogenic hormone had been given for six weeks.

Osteo-arthritis.—The response was uniformly unsatisfactory.

Ankylosing Spondylitis.—The response was extremely satisfactory. In 1 of the 4 cases the patient's posture before treatment was similar to that in postencephalitic parkinsonism. After four hours the range of movements had greatly improved, and this improvement lasted twelve hours. After the second injection the improvement continued for twenty-four hours. On cessation of treatment the 4 cases reverted to their former condition.

Traumatic Arthritis.—In both cases pain and swelling were completely or almost completely dispelled, and the range of movement was increased; some improvement persisted when treatment was stopped.

Acute Sciatica.—The response was on the whole satisfactory, and in some cases it was spectacular.

Acute and Subacute Rheumatic Fever.—No response was noted.

Thus the method seems to be of value in rheumatoid arthritis, especially of the more acute type. In spondylitis and traumatic arthritis it may provide symptomatic relief; and relief was also noted in 2 cases of acute sciatica.

Cairo.
HOSNY AYAD.

1. Lewin, E., Wassén, E. *Lancet*, 1949, ii, 993.
2. Methier, S. R., Gordon, G. S., Rinehart, J. F., Plumhof, C., Ellenhorn, M. J., McBride, A. *Bull. Univ. Calif. med. Center*, Jan. 1950. Le Vay, D., Loxton, G. E. *Lancet*, 1950, i, 209. Landsberg, M. *Ibid*, p. 134. Robertson, J. A. *Ibid*, p. 135. Nashat, F. *Ibid*, p. 135. Fox, W. W. *Ibid*, p. 135.
3. Kersley, G. D., Mandel, L., Jeffrey, M. R. *Ibid*, p. 703. Bywaters, E. G. L., Dixon, A. St. J., Wild, J. B. *Ibid*, p. 951.

SIR,—We have followed with interest the controversy over the effect of deoxycortone and ascorbic acid in rheumatoid arthritis since the original communication of Lewin and Wassén. Rheumatoid arthritis is a disease notorious for its exacerbations and remissions, so that any evaluation of the efficacy of a given therapeutic regimen in this disease is admittedly difficult. The dramatic and definite clinical response to 'Cortisone' and A.C.T.H. in all or almost all cases of rheumatoid arthritis, however, cannot be questioned.

It occurred to us that the comparison of the response of the same patient to Lewin and Wassén's regimen and to cortisone would be a more objective method of evaluating this method of therapy. We have therefore given 4 patients with classical severe rheumatoid arthritis a two-week course of cortisone. Therapy was then discontinued for two weeks, after which they were given a two-week course on the exact regimen outlined by Lewin and Wassén, with injections once daily. All 4 patients had a rather dramatic response to cortisone, with alleviation of their arthritis. After two weeks off therapy, 3 of the patients had relapsed while 1 remained in remission. The relapse continued and indeed increased in severity during the next two weeks in these 3 patients, despite daily injections of deoxycortone and ascorbic acid. The fourth patient has remained in remission to the time of writing, six weeks later.

In this study deoxycortone and ascorbic acid had no noticeable effect on the clinical manifestations of rheumatoid arthritis. Our results are strikingly similar to those of Dr. Dresner and his colleagues.[1]

U.S. Marine Hospital,
Baltimore,
Maryland, U.S.A.

LUTHER L. TERRY
FRANK LONDON.

SIR,—Cranswick and Hall,[2] who treated 37 mental patients with deoxycortone and ascorbic acid, noted temporary benefit in 11 depressives with a history of less than one year; and in 4 of these the depression remitted. Moreover, of 12 patients who benefited previously or subsequently from electroconvulsive therapy (E.C.T.), 11 also showed a positive reaction with deoxycortone. Bourne[3] reported complete failure to confirm these claims and found no favourable response in 9 patients, 8 of whom later did well with E.C.T.

Although the claims made for this treatment in its original field of application—rheumatoid arthritis—had also been refuted,[4] we thought it desirable to run a preliminary therapeutic trial, in which 30 patients suffering from a depressive illness (excluding patients with schizophrenia or cerebral disease) were treated with deoxycortone and ascorbic acid.

The group consisted of 12 male and 18 female voluntary patients, mainly over the age of 40 (average age 56·3 years, with 8 patients over 70 and only 3 under 30). 11 patients were severely depressed; in 10 the depression was only moderate; and in 9 the affective disorder was mild though still justifying the use of E.C.T. as a last resort.

Most of the patients were treated in accordance with an agreed programme which provided for six intramuscular injections of deoxycortone acetate in oily solution followed immediately by intravenous injection of 1 g. ascorbic acid, given every other day. The technique was that of Lewin and Wassén,[5] which had been employed by Cranswick and Hall; and the sequence of dosage was 2·5 mg., 2·5 mg., 5·0 mg., 5·0 mg., 2·5 mg., 2·5 mg.; any dose followed by clinical improvement was to be repeated at lengthening intervals. Supplementing clinical observation, numerical ratings of the mental state were recorded before, during, and after the treatment on a modified version of the Worcester behaviour chart.

In no case did we obtain convincing evidence of changes comparable with responses to E.C.T. In 4 cases improvement followed the course of deoxycortone; however, 2 cases soon relapsed and failed to respond to further injections, but remitted satisfactorily with E.C.T. Short spells of subjective well-being and cheerful overactivity occurred in 8 patients two to three hours after an injection and lasted a few hours; but these results were not consistently repeated. The most marked reaction occurred in a mildly depressed man, aged 53, who had never shown any manic components to his illness, but who after his fourth injection (5 mg.) became elated and flirtatious, with a voracious appetite, for a few hours followed by more profound depression on the following day; later E.C.T. produced only temporary benefit. 22 patients were given E.C.T., generally one week after the deoxycortone course, and in 18 the depressive symptoms responded satisfactorily. Of the 30 who received deoxycortone between June and August of this year, 21 have so far been discharged.

While occasional euphoric episodes following some injections of deoxycortone are of interest and may deserve further investigation, our results have convinced us that deoxycortone and ascorbic acid is unlikely to find a place in the treatment of depressive illness.

Bethlem Royal Hospital and
Maudsley Hospital,
London, S.E.5.

D. L. DAVIES
A. HARRIS
F. POST.

SIR,—Among the diseases which may occur in his general adaptation syndrome Selye[1] includes several skin conditions, such as lupus erythematosus, scleroderma, and psoriasis; and in the few cases in which A.C.T.H. has been tried in the United States the response of these ailments seemed encouraging.[2] Conflicting reports have followed the publication by Lewin and Wassén[3] of their successful results in rheumatoid arthritis treated with deoxycortone and ascorbic acid, but nevertheless it was decided to try this combination in cases of these skin diseases. Some cases of alopecia areata have been included on the grounds that this disease also is the result of a failure in the normal response to stress.

The patients were treated for 6–8 weeks by one of two routines: (1) deoxycortone acetate 5 mg. intramuscularly and ascorbic acid 1 g. intravenously once a week; or (2) deoxycortone 5 mg. and ascorbic acid 0·5 g. injected by the same routes as in (1) twice a week. There was no significant difference in the results of the two methods, and whichever routine was the more convenient was chosen for the individual case, since all but one were treated as outpatients. Erythrocyte-sedimentation rates (E.S.R.) were estimated at the start of treatment and at regular intervals subsequently.

RESULTS

Lupus erythematosus.—Of the 10 cases treated, 1 was slightly improved but subsequently relapsed, 2 became worse, and the remaining 7 were unchanged. These results were confirmed by the E.S.R. readings; where the E.S.R. was initially raised it remained raised with minor fluctuations, and where it was originally within normal limits it remained so.

Psoriasis.—Of the 8 cases, 3 were given, as controls, 5 ml. of physiological saline solution intravenously twice a week for four weeks. Of the 5 treated with deoxycortone acetate, 2 were improved and will probably clear completely, 2 showed no change, and 1 was worse. Of the controls, 2 were improved and will probably clear completely. In 1 case treated with deoxycortone, where there was associated rheumatoid arthritis, the psoriasis was greatly improved but the arthritis was unchanged, as judged by the clinical appearances, measurement of the wrist-joints, and the E.S.R.; this was the only case of psoriasis in which the E.S.R. was raised.

Scleroderma.—3 cases were treated without benefit, though 1 showed initial subjective improvement.

Alopecia areata.—Of 7 cases treated, 2 long-standing ones improved, and the remaining 5 showed no change. All these cases have been observed for three months from the start of treatment. The E.S.R. was normal in every case.

1. Dresner, E., Pugh, L. G. C., Wild, J. B. *Lancet*, 1950, i, 1149.
2. Cranswick, E. H., Hall, T. C. *Ibid*, p. 540.
3. Bourne, H. *Ibid*, p. 925.
4. Bywaters, E. G. L., Dixon, A. S., Wild, J. B. *Ibid*, p. 951.
5. Lewin, E., Wassén, E. *Ibid*, 1949, ii, 993.

1. Selye, H. *Brit. med. J.* 1950, i, 1383.
2. Hench, P. S. *Ann. rheum. Dis.* 1949, 8, 97.
3. Lewin, E., Wassén, E. *Lancet*, 1949, ii, 993.

There were no dramatic results in any of the cases treated. Lupus erythematosus and scleroderma do not seem to be materially benefited by this treatment. Of the 5 treated cases of psoriasis 2 improved, but so did 2 of the 3 controls, so one cannot attribute the change to treatment. The improvement in 2 out of 7 cases of alopecia areata in the absence of any controls can also hardly be credited to the deoxycortone. All in all, we are inclined to attribute the improvement noted in 4 cases out of the series of 25 (excluding controls) to the psychological effect of the injections.

We wish to thank Dr. George Harvey for permission to publish these cases.

J. O'D. ALEXANDER
THOMAS COCHRANE.

Royal Infirmary, Glasgow.

FLORENCE NIGHTINGALE

SIR,—I submit for consideration the theory that Florence Nightingale suffered from hyperthyroidism which later turned to deficiency and mild myxœdema. Her outstanding intellectual powers were fortified by the demoniac energy that excess of thyroid secretion gave her, and which caused her to use ruthlessly all her friends and relations in pursuit of her objectives. It explains the prostration, heart-attacks, and so on which caused her friends to believe her to be dying, and, too, the calmness and placidity of her later years.

There is no suggestion in the "Life"[1] of a goitre; on the other hand, she would not allow herself in her active years to be photographed, and so no record is available. The photograph that is reproduced is one taken at the age of 70 and, though a profile, is very suggestive of myxœdema.

W. FRASER ANNAND.

Coventry.

ST. PAUL'S CRAY APPOINTMENTS

SIR,—It is quite evident that the four doctors whose letter appeared in your issue of Nov. 25 (p. 655) did not read my speech, as I have never, in the House of Commons or elsewhere, alleged "that the L.C.C. had 'appointed'" them. What I said was:

"I found that Dr. J. D. Paulett was granted, by the county council, a house compulsorily acquired from a private owner, and that, having got those premises, he applied to the Medical Practices Committee, saying he had been granted, not a house, but the doctor's house on the estate and, therefore, asked them to give him permission to practise.

"At that time, there were other doctors who had submitted their names to the London County Council as wishing to practise on this estate, but only the name of Dr. Paulett appears to have gone forward and, as there was only one applicant and a growing demand by a new population, the *Medical Practices Committee had no option but to appoint him.* Subsequently, a second doctor, Dr. L. M. Franklin, was appointed to Dr. Paulett's practice. He had been on the London County Council list for houses, but he subsequently acquired one privately in the area and withdrew his name from the county council list. Later, a third doctor, Dr. Tuckman, was appointed to practise, he having applied to practise with Dr. Paulett. Finally, a Dr. Tepper was appointed. He was allocated a London County Council house on the estate, and *he applied to the Committee that he might be permitted to practise,* having had premises and facilities given him by the L.C.C."

From this it will also be seen that I made it quite clear that only two were L.C.C. tenants.

It is, I understand, the policy for these new estates that the medical practitioner should live on, or in the immediate vicinity of, the estate. The physical possession of premises is, therefore, valuable and indeed vital to appointment; and where council houses are available, the selection of a tenant for the doctor's house, before appointment by the Medical Practices Committee, must prejudice the chances of other doctors, equally qualified and anxious to practise, but not granted a tenancy.

PATRICIA HORNSBY-SMITH.

House of Commons.

1. Smith, C. W. Florence Nightingale. London, 1950. See *Lancet*, Dec. 2, 1950, p. 691.

ROYAL MEDICAL BENEVOLENT FUND

SIR,—As Christmas day is near at hand I should like to remind your readers of our Christmas gifts fund, in the hope that those who have not sent their contributions will now do so quickly. We must not fail in bringing happiness and extra comforts to our beneficiaries. Contributions should be sent to Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, marked "Christmas Gifts," and will be gratefully acknowledged.

C. LUTHER BATTESON
Honorary Treasurer,
Royal Medical Benevolent Fund.

ORAL STREPTOMYCIN IN GASTRO-ENTERITIS

SIR,—In view of the contradictory reports regarding the value of streptomycin by mouth in gastro-enteritis of infancy and early childhood, and because of the vital importance of any successful therapy, especially for this country where about half the fatalities in the first year of life are due to this cause, this treatment has been carefully studied in our hospital.

Altogether 60 infants were given streptomycin by mouth. Of these, 30 were severe cases of acute toxic dyspepsia; and the other 30 were chronic cases of severe gastro-enteritis which had for months resisted all treatment, dietetic and chemotherapeutic, and many of which had passed into a marasmic state sometimes complicated, for example, by nutritional œdema or bronchopneumonia. Over 90% showed *Bact. coli* on stool-culture. The results are summarised in tables I and II.

In the acute series (table I) the 100% recovery-rate, with only 6% relapses, suggests that streptomycin exerts a curative action. Nevertheless, a good number of these acute cases respond to ordinary conservative measures, so that small differences in percentages are not decisive.

The evidence in the chronic resistant cases (table II), however, is fairly conclusive. All these cases had for months resisted all other measures; and over 90% were cured with administration of streptomycin by mouth. Sometimes the response was dramatic. For example, in one case chronic severe diarrhœa of six months' duration was cured in thirty-six hours and did not relapse in the subsequent three months; and in another chronic vomiting which had persisted for one month was cured in two days. We believe that the response in these chronic resistant cases puts the value of oral streptomycin therapy beyond doubt.

We would advise the use of streptomycin by mouth in all cases of chronic resistant gastro-enteritis, especially those revealing *B. coli* on stool-culture; as to the acute

TABLE I—ACUTE TOXIC CASES

Treatment	No. of cases	Response		Deaths	Av. increase in weight per week (g.)	No. of cases becoming chronic	Relapses
		Within 1 week	Over 1 week				
Streptomycin ..	30	24 (80%)	6 (20%)	0	300	0	2 (6·6%)
Controls (sulphaguanidine) ..	30	18 (60%)	6 (20%)	4 (13·3%)	50	2 (6·6%)	6 (20%)

TABLE II—CHRONIC CASES

Treatment	No. of cases	Cases responding	Interval before response	Deaths	Relapses
Streptomycin ..	30	29 (97%)	1–21 days	1 (3·2%)	2 (6·6%)
Controls ..	30	0	—	—	—

cases streptomycin should be tried at least in the severe toxic group, where it may prove a life-saving measure.

The dosage which usually seemed most suitable was 2 g. for the acute and 3 g. for the chronic cases, given over 6–10 days, three-hourly before feeds dissolved in sterile water or glucose solution.

The details of this work will be published in the *Egyptian Medical Journal*.

M. DIWANY
ZAHERA H. ABDIN.

Children's Department, Kasr-el-Aini, Faculty of Medicine, Cairo.

TROPHIC AND TROPIC

SIR,—In reply to Professor Dible's letter last week, I would point out that the arguments seem in favour of "trophic" rather than "tropic." Common scientific words in botany are "geotropic" and "heliotropic," which indicate a turning to the earth or a turning to the sun. The hormone from the anterior lobe of the pituitary does not turn to the thyroid gland, nor is it attracted by the thyroid gland, but it exerts a most important influence on the development of the thyroid gland. In its absence the thyroid gland diminishes to a very small size; it undergoes "atrophy"; it does not undergo "atropy." Surely it is clear that the words "thyrotrophic" and "gonadotrophic" are correct.

Department of Pharmacology, Oxford. J. HAROLD BURN.

REVOLT AT KINGSTON

SIR,—The letter from Dr. Stark Murray in your issue of Nov. 25 will, I am sure, not be accepted as a strictly factual survey of the position that has arisen at Kingston.

1. It is only beginning to be appreciated what autonomy the regional hospital boards possess, and it has been widely known for some time that they do not publish their plans in advance in order that they may be considered and commented on by interested bodies generally. Recommendations of the board's committees involving considerable and fundamental changes in the hospital arrangements of a particular area are accepted by the board as its policy, and it is only thereafter that the area concerned is informed. Representations of any sort, at any level, made subsequently appear to be unavailing.

2. Who is to decide on the best use of hospital beds in any particular district? This question, I submit, is crucial in the whole problem of hospital accommodation. Should a remote body, the regional hospital board, or a local body, the hospital management committee, be the arbiter? In the present "set-up" neither body seems to be really representative of the people. The members of both are nominated, with the hospital management committee responsible to the regional hospital board, but the latter, according to the Minister, actually responsible to no higher authority. Surely, in this age of democracy, a method of election by really interested parties from below upwards is not beyond the wit of man?

3. Dr. Murray is quite wrong in saying that the general practitioners exercised a close control on the number of doctors using the Victoria. True, the number was increased in 1948 owing to a considerable influx of younger men after the war. Nevertheless, no general practitioner who has applied for admission has ever been refused.

In 1938 the lay committee of the Victoria Hospital agreed that Dr. Stark Murray should be appointed as pathologist for three years. By 1941 the emergency pathological service of the Ministry of Health was in operation; Dr. Murray was in local charge of this service, which did the pathology of the Victoria. The question of his appointment was not reopened, and in consequence he has not been a member of the "elected consulting staff" since that year.

In his statement on the medical review of the region by the board, Dr. Murray states he was a member of the review committee and that he also supplied evidence. In addition he is a member of the regional board and its medical advisory committee. Now, it is an established axiom of British jurisprudence that no-one can at the same time be witness, member of the jury, and judge. But, by his own statement, this is what happened. This action provides incontrovertible evidence for our demand for an impartial public inquiry—the recommendation of which we are prepared to accept in advance.

4. The board has not offered the general practitioners 38 beds in exchange for the Victoria. It has offered a "hospital" obsolete for fifteen years, with no facilities of any sort worth talking about, and which is capable of holding, at most, 24 beds for acute sick. Despite inquiry, no information whatever of what consulting staff may be available has been given. The hospital service of the area has always been mainly based on specialists. Why de-grade the general practitioners from a position they have held since the founding of the hospital in 1898 to one of considerably lower status? It is through the present arrangement that the general practitioners are able to maintain a reasonably high standard in the domiciliary service they offer to the population generally. If this present arrangement is destroyed—and if Dr. Murray's advice is taken it will be destroyed—then the standard of general practice will inevitably fall, the patient will be the loser, and the service will suffer. Is it the policy of the regional hospital board to build up a hospital service at the expense of the general-practitioner service? If this is so, I am sure it is not what Parliament intended.

Dr. Murray is quite wrong in saying that in this group there are no beds solely under general practitioners. Apart from Kingston and Richmond, all the beds are solely under the general practitioners, with, of course, specialist cover available. This is one of the features we are anxious to preserve. The addition of "special unit" accommodation does not in any way depend on the change of use of the Victoria.

5. To say that the staff of the Victoria has never held a meeting to discuss the question—who on earth is going to believe such rubbish? Dr. Murray has never been invited, because, as I have pointed out, he is not accepted as being a member of the staff.

Further, Sir, you will find that when the petition which is at present being circulated is presented, a large proportion of people in the boroughs of Kingston and Malden will be shown as having expressed their opinion against the proposal.

Indeed, wiser counsels must prevail. We have never refused "to sit round a table with those who have the arduous task of running the hospitals" to discuss the matter in its entirety; in fact we have never been asked to do so. We would be delighted to have the opportunity to put the case for the retention of the general-practitioner hospital as an essential feature of the National Health Service. This type of inquiry is that demanded recently by the British Medical Association.

New Malden, Surrey. T. W. MORGAN.

CHEMICAL PROPERTIES OF P.A.S.

SIR,—In the course of a study of *p*-aminosalicylic acid (P.A.S.), this substance was found to have certain chemical peculiarities which may be relevant to studies of its bacteriostatic effects.

P.A.S. is a very strong reducing substance. Potassium permanganate solution and potassium ferricyanate in the Hagedorn-Jensen system are reduced far more by it than by sodium salicylate. But P.A.S. has the following chemical qualities, which sodium salicylate does not possess:

1. It binds a large amount of iodine from an iodine solution.
2. In the presence of sunshine it increases the separation of metallic silver from the complex silver aminohydroxide; and if this latter is mildly warmed, it selects a silver mirror from it. It greatly enhances the separation by sunshine of silver from photosensitive silver phosphate. This is important for the estimation of urinary phosphatase.

The urine of patients treated with P.A.S. reduces Nylander solution, but Fehling's solution it reduces not at all or only very slightly. We find that the reducing substance is not a sugar. We have, however, found glycuronic acid in the urine of patients treated with P.A.S.

Z. HORN
S. BOGSCH.

Koltói Anna Hospital, Budapest.

PETHIDINE AND THIOPENTONE

SIR,—The use of pethidine hydrochloride as an adjunct to nitrous oxide anæsthesia is becoming increasingly popular; and I should like to draw the attention of potential users of this technique to the incompatibility of pethidine hydrochloride solutions with those of thiopentone sodium.

Presumably owing to the marked difference in pH between the two solutions, a precipitate forms upon mixing. If it is desired to follow the injection of thiopentone sodium with pethidine hydrochloride, untoward effects can be obviated by washing the apparatus, including the Gordh needle if used, with normal saline solution, before injecting pethidine hydrochloride.

Queen Victoria Hospital, East Grinstead, Sussex. F. H. SUMMERS Pharmacist.

CONSCIOUSNESS WITH VENTRICULAR FIBRILLATION

SIR,—We should be very grateful if any of your readers would give us information about the duration of consciousness after the onset of ventricular fibrillation. This point arises in connection with the killing of dogs and cats by electricity. In this procedure the current is passed from the neck to the hind-quarters, not through the brain, and death is believed to be due to ventricular fibrillation. Observations on the duration of consciousness after ventricular arrest in Stokes-Adams attacks would also be of great interest. Any communication reaching us will be most gratefully acknowledged.

F. JEAN VINTER
Technical Secretary.
Universities Federation for Animal Welfare, 284, Regent's Park Road, London, N.3.

ENURESIS AND HYPERSOMNIA

SIR,—In your issue of July 22, Dr. Ström-Olsen points out that in adults enuresis may be associated with deep sleep.

For a number of years I have been aware of this, and accordingly I have been treating my enuretics with compounds of the ephedrine or amphetamine type, with gratifying results. I started using this kind of treatment after reading the chapter on sleep by Dr. Regelsberger in the German *Encyclopædia of Modern Medicine* (Spanish translation, 1935). He had found that in enuretics the curve of alveolar carbon dioxide reaches its peak (which is abnormally high) at the time of involuntary micturition. In the same book Nassau mentions the relation of nocturnal enuresis with abnormally deep sleep.

Madrid. EMILIO DE LA PEÑA.

SCORPION STINGS

SIR,—Aly, Abul-Fadl, and Roushdy [1] have reported on the use of various substances against scorpion venom. In common with these workers, we were prompted by the letter of McSorley and Perry [2] to ascertain the effect of emetine on animals envenomated with scorpion venom. At the same time various other substances with alleged antidotal action were tested. Some of the results, which support the findings of Aly et al., were mentioned in the annual report of this institute for the year 1949.

The venom used was obtained from South African members of the genus parabuthus; the experimental animals were guineapigs and mice; the substances tested were emetine, atropine, adrenaline, procaine, ergotamine, dihydroergotamine, calcium gluconate, dimercaprol (BAL) anti-histamine ('Histostab,' Boots). Combinations of atropine with either dihydroergotamine or anti-histamine were also tried. The survival-rate and survival-time of the treated animals and the controls did not differ significantly. Atropine suppressed both the secretion from the respiratory passage and the salivation, and procaine abolished the severe pain; otherwise the symptoms of envenomation were not altered.

Ahuja and Brooks [3] have shown, and Christensen and de Waal [4] confirmed, that local infiltration with a carbolic-soap solution offers some protection against cobra venom. We have since found that guineapigs which have received an LD_{50} of parabuthus venom in the muscle of a hind-leg, and which subsequently are treated by infiltration of the site with a 5% solution of carbolic soap in water stand a significantly better chance of survival than untreated controls.

We should like to add that all the substances mentioned, with the exception of soap, were also tested against spider (*Lactrodectus indistinctus*) venom in mice and were found to be useless. That calcium gluconate failed is of interest as it apparently has beneficial effect in treating spider-bite in man.

P. AGERHOLM CHRISTENSEN
MARGARET WIDDICOMBE.
South African Institute for Medical Research, Johannesburg.

STUDY OF DELINQUENCY

SIR,—May I add my voice to Dr. Bodman's in criticism of Dr. Stott's curiously biased Study of Delinquency in your issue of Nov. 25. Dr. Stott writes with a very large bee in his bonnet, but with Dr. Bodman I will be charitable and suggest that his experience appears to be "strangely limited." Such tendentious statements as: "Neither the public nor the State have yet begun seriously to deal with the child in his pre-delinquent phases. Public concern is limited to punishing him when he dares to force his unhappiness [sic] upon us," and "Quite unnecessarily we allow unhappy children to remain unhappy" may be good propaganda, but they are a bad basis for a scientific study.

Dr. Bodman last week took up the more obvious prejudices in the article. These I will not repeat, but I would note some other omissions. My experience at a child-guidance clinic over the past ten years is that the good teacher needs no special training to spot "the unhappy child and potential delinquent." He (or more often she) is only too pleased to use the local facilities. One would think that Dr. Stott had never heard of the now 20-year-old child-guidance movement, and knew nothing of the technique of examination and treatment at a child-guidance clinic. Not that facilities are all they might be; but I am afraid Dr. Stott's approach will not endear him to our administrators and make it any easier to extend them.

Dr. Stott seems to have been very unlucky in his strange clinical contacts. His cases make quaint reading. But anyone can give odd examples of this kind, and I rather suspect him to be putting up aunt-sallies to knock them down. I will not comment on his psychological views except to note that amongst a great deal of shrewd observation there is much vague theorising and angry prejudice.

In conclusion I would quote Dr. Stott's own remarks against himself. "But before we can press these points we must convince the public that the psychologist can deliver the goods." Let Dr. Stott try his hand for a number of years at treating his delinquents in the social environment in which they are to live subsequently. He may find the experience not a little chastening, and discover that to make wild comments as a result of a research on some approved-school types is much easier than to deliver the therapeutic goods to the public.

Leeds. H. EDELSTON.

1. Aly, M., Abul-Fadl, M. A. M., Roushdy, M. *Lancet*, 1950, 1, 1135.
2. McSorley, J. G. A., Perry, L. M. *Ibid*, 1949, 1, 889.
3. Ahuja, M. L., Brooks, A. G. *Indian med. Gaz.* 1945, **80**, 461.
4. Christensen, P. A., de Waal, M. *S. Afr. med. J.* 1947, **21**, 680.

Parliament

Voluntary Euthanasia

IN the House of Lords on Nov. 28 Lord CHORLEY asked the Government at any rate to accept the principle of voluntary euthanasia so that legislation could be introduced in due course. He suggested that euthanasia might be granted on the following conditions:

The sufferer must be not less than 21 years of age, of sound mind, and suffering from an incurable and fatal illness involving severe pain. He must make application in writing on a form signed in the presence of two witnesses. The application must be supported by two medical certificates one from the applicant's own doctor and the other from a doctor with special qualifications for dealing with these cases; the application must be made to a referee appointed by the Minister of Health, and the referee must personally see the sufferer to ensure that the conditions had been fulfilled and that the patient fully understood the nature and purpose of the application. Euthanasia would be administered by a doctor from a special panel maintained for the purpose.

The ARCHBISHOP OF YORK opposed the proposal not through lack of sympathy but for religious and social reasons. He could not criticise the doctor who, with a full sense of responsibility, alleviated pain, even if by so doing he shortened the life of a patient dying from an incurable disease. But this, he felt, was entirely different from passing legislation on the subject. It would be a serious matter if for the first time there appeared on the statute-book a law which gave certain people licence to kill some of their fellow men and women. Capital punishment was justified only because it was the vindication of the sacredness of human life. If once legislation of this kind was allowed, where were we to stop? Why should it not apply to the feeble-minded, the physically crippled, and those in mental asylums?

Lord HORDER hoped that the decision would not lie with the doctor. Putting an end to human life involved a new principle in biological control, so foreign to the general sense of the community that he would be very surprised if it were accepted in Lord Chorley's lifetime, or ever. A good doctor, in Lord Dawson's words, distinguished between prolonging life and prolonging the act of dying. Any sanction which would reverse the doctor's function—to cure the patient's disease or prolong his life so far as might be—would not be in the public interest.

Turning to the criteria laid down by euthanasia advocates, Lord Horder pointed out that the disease which was incurable today might be cured next year. Again the threshold of pain varied enormously in different patients, and only the experienced doctor could judge how much pain was being suffered. There had never been so many means of alleviating pain as today. Illness, and even pain, for many people constituted a new experience, unhappy, but possessing spiritual significance and value. To call the function of a doctor who helped a patient to achieve that degree of elevation of spirit an intolerable burden seemed to Lord Horder to be disparaging one of the very important duties that a doctor had to perform. The two extremes of dying in pain and being killed did not exhaust the possibilities of the stricken patient. There was a middle position achieved again and again by a kindly and skilful doctor who gave assistance to a fellow human being who had become an intimate friend. A further criterion was that the patient must be of sound mind, but there was no less difficulty in judging the patient's state of mind than in assessing the amount of his pain and the incurability of his disease. The mind of the patient suffering from a lethal illness was not unsound in a legal sense, but it was uncertain and fitful, variable, and with little certainty or clearness of purpose. If euthanasia were introduced Lord Horder feared that old people might avail themselves of it, or think they ought to do so, because they felt they were encumbering the ground and would like to make room for someone else.

Lord AMULREE pointed out the change that a law of this sort would make in the atmosphere of the sick-room. At present the patient was convinced that the doctors and nurses were doing their best to alleviate his pain. If a patient felt that one day the doctor would come in as executioner, even though the patient might long to end his life himself because of pain, Lord Amulree did not think that it would lead to an improvement in the relations between doctor and patient. Lord UVEDALE held that there were few cases at present where euthanasia should be contemplated, and these cases would become fewer still as new remedies were introduced. The matter should be approached with great caution remembering with all humility that euthanasia was an admission of failure and a counsel of despair.

Lord HADEN-GUEST reported that at the meeting of the World Medical Association in Scandinavia this spring a resolution was passed against euthanasia. The association represented doctors from every country in the world which chose to send delegates, and he thought it might be said that the vast majority of medical opinion in the whole world was against euthanasia. The vast majority of doctors in this country felt that whoever else was going to administer euthanasia, it was not they. The suggestion that the business of euthanasia should be put in their hands, that they should meet round the bedside of a patient and give him some injection to cause death, was to them a dishonourable suggestion.

Lord WEBB-JOHNSON also thought the idea of euthanasia was dreadful when one had spent a lifetime in taking risks to save human life. He cited instances of several incurable diseases which had lately become curable. Were they to contemplate the situation in the sick-room where an elderly patient with a chronic illness looked round with suspicion and accepted every suggestion such as: "How can you bear all this?" or "Don't you wish it was over?" as a suggestion that he should apply for the appropriate form and fill it in? Moreover, suppose, quite clearly on his own initiative, the patient put forward a request for release; was not to agree to that request legalising suicide? Lord Webb-Johnson thought it was.

Lord JOWITT, the Lord Chancellor, said that from the legal point of view the consequences of passing a Bill of this kind would be grave and serious. The doctrine of what was called putting people out of their misery for the reasons which had been advanced might have serious repercussions on the criminal law of the land. The introduction of a Bill, no matter what the safeguards might be, would be wrong, because there could be no adequate safeguards when they allowed one human being to start killing another. Once they departed from the doctrine of the sanctity of human life they would indeed be on the slippery slope.

QUESTION TIME

Registrar Appointments

Mr. J. K. VAUGHAN-MORGAN asked the Minister of Health whether he would withdraw his proposals for an immediate cut in hospital registrar establishments, with a view to putting forward an alternative scheme which would cause less hardship to those concerned, particularly those trainees whose careers had already been seriously affected by their war service.—Mr. A. BEVAN replied: This circular, which has been grossly misrepresented, was issued after full consultation with the profession's representatives. Its object is in the interests of the profession itself—to secure a proper relationship between the numbers of training posts for future specialists and the number of specialist posts likely to be available. In estimating the latter it allows for a reasonable annual expansion over and above mere replacements in present posts, and the numbers of training posts will be reviewed as and when further expansion occurs in later years. The urgency of the circular is that the number of trainees has already risen to nearly twice the number needed to produce the specialists likely to be required and about four times the pre-war number, a situation thoroughly unfair to all concerned. The circular was not prompted by economy—indeed, it provides for alternative appointments if necessary for the work of the hospital.

Mr. VAUGHAN-MORGAN: What prospects of suitable employment are open to those 1100 hospital registrars who would become redundant as the result of the proposed cut in establishment over and above the 700 appointments which are vacant in the Services and Colonial Medical Services.—Mr. BEVAN: Each existing senior registrar and registrar will complete his present year of appointment. Afterwards

a senior registrar whose appointment is not renewed but whose services are still needed may be offered a similar temporary hospital appointment for one year. Others and registrars can—as has always been the case where appointments in these training grades have not been renewed—apply to set up in general practice, possibly supplemented by a part-time clinical assistantship at a hospital, or for appointments in civilian medical practice in this country as well as in the fields referred to by the hon. Member, or for university and hospital appointments abroad.

Replying to Mr. Henry Brooke, Mr. Bevan said that the number of posts of registrar and senior registrar which would be abolished in hospitals in the North-West Metropolitan region if his recent circular was fully implemented was about 240 and 290 respectively (including the figures for the teaching hospitals in the area).

Beds in Tuberculosis Sanatoria

Mr. SOMERVILLE HASTINGS asked the Minister what was the number of beds reserved for the treatment of pulmonary tuberculosis in sanatoria, general hospitals, and fever hospitals, respectively, which were now empty because of shortage of nursing and domestic staff; what was the number of beds at present reserved for the treatment of pulmonary tuberculosis in sanatoria, general hospitals, and fever hospitals, respectively.—Mr. BEVAN replied: The number of tuberculosis beds provided in institutions classed as sanatoria and tuberculosis hospitals is about 27,700, of which about 4400 are unstaffed. There are some 3500 staffed tuberculosis beds in other hospitals. Of the 31,200 staffed beds approximately 27,200 are for pulmonary and 4000 for non-pulmonary tuberculosis.

Service Pay

In answer to a question, Mr. EMANUEL SHINWELL stated that increases in pay had been approved for medical and dental officers of the three Services. In addition there will be increases in specialist pay for medical and dental specialists in the Royal Navy and Army; in the Royal Air Force specialist qualifications will continue to be recognised by a system of accelerated promotion. The increased rates will not apply to National Service officers until they have completed 18 months' whole-time service. The increases and new rates, which will take effect from Sept. 1, 1950, are as follows:

BASIC PAY

Rank (only Army ranks shown)	Increases		New rates			
			Medical officers		Dental officers	
	Daily	Annual	Daily	Annual	Daily	Annual
	s. d.	£	s. d.	£	s. d.	£
Lieutenant ..	4 6	82	26 6	484	24 6	447
Captain ..	,,	,,	32 6	593	29 6	538
After 2 years ..	,,	,,	35 6	648	32 6	593
,, 3 ,, ..	7 0	128	38 0	694	35 0	639
,, 4 ,, ..	,,	,,	41 0	748	38 0	694
,, 6 ,, ..	,,	,,	44 0	803	41 0	748
Major	7 0	128	50 0	913	47 0	858
After 2 years ..	,,	,,	53 0	967	50 0	913
,, 4 ,, ..	,,	,,	56 0	1022	53 0	967
,, 6 ,, ..	,,	,,	59 0	1077	56 0	1022
Lieut.-Colonel ..	8 0	146	66 0	1205	63 0	1150
After 2 years ..	,,	,,	69 0	1259	66 0	1205
,, 4 ,, ..	,,	,,	72 0	1314	69 0	1259
,, 6 ,, ..	,,	,,	75 0	1369	72 0	1314
,, 8 ,, ..	,,	,,	78 0	1424	75 0	1369
Colonel ..	10 0	183	85 0	1551	82 0	1497
After 2 years ..	,,	,,	88 0	1606	85 0	1551
,, 4 ,, ..	,,	,,	91 0	1661	88 0	1606
,, 6 ,, ..	,,	,,	94 0	1716	91 0	1661
Brigadier ..	10 0	183	97 0	1770	94 0	1716
Major-General ..	,,	,,	120 0	2190	120 0	2190
Lieut.-General	15 0	274	150 0	2738	..	..

SPECIALIST PAY

—	Royal Navy		Army	
	Increase	New daily rates	Increase	New daily rates
Graded specialist ..	..	5/–	..	4/–
Full specialist ..	3/– a day	8/–	4/– a day	8/–

National Service Medical Exemptions

In answer to a question Mr. G. A. ISAACS, Minister of Labour, said the numbers of men exempted from national service on medical grounds from 1946 to 1949 and those exempted this year were as follows:

Year	Number exempted from National Service on medical grounds *
1946	39,964
1947	24,648
1948	24,711
1949	33,818
1950 (to Sept. 28)	34,506

* Excluding men not examined—e.g., the blind and limbless.

Obituary

WILLIAM WILLIS DALZIEL THOMSON

KT., B.A. R.U.I., M.D., B.SC. Belf., F.R.C.P.

Sir William Thomson, professor of medicine in Queen's University, Belfast, and its representative on the General Medical Council, died on Nov. 26, at the age of 65.

A son of the late Dr. W. Thomson, J.P., of Anahilt House, Hillsborough, co. Down, he was educated at Campbell College, Belfast, and later at the Queen's University. The whole of his academic career was a succession of brilliant achievements. In 1906 he won the Henry Hutchinson Stewart scholarship of the Royal University of Ireland, and in the following year, after gaining the Dunville studentship and senior scholarship in chemistry at Queen's University, he graduated B.A. with first-class honours. In 1919 he obtained his medical qualifications in Queen's, again with first-class honours, which then, as now, was a rare achievement.

His first teaching post at Queen's was in the physiology department, from which he went on to be Riddell demonstrator in pathology. During this period he added a B.SC. to his name, again with first-class honours. He travelled abroad and studied in Paris and Budapest. After this he carried on his research work while he was with the R.A.M.C. in the B.E.F., attached to Sir Almroth Wright's laboratory. Later he used to recall how in those early days they did blood-transfusions without grouping. On soldiers suffering from trench nephritis the first blood-ureas were done, and in these war years Thomson did the first series of blood-urea estimations in prostatic obstruction. He never published these, but his work on war nephritis appeared in 1918. In 1916 he had obtained an M.D. with gold medal, thus completing an academic career whose lustre has rarely if ever been equalled in the annals of Queen's University.

[Stoneman

It was only natural that a man of his attainments should serve in the teaching of others, and shortly after his return to Belfast, in 1923, he was appointed professor of medicine. Five years later he was elected a fellow of the Royal College of Physicians of London. He served on the staff of the Mater Hospital before his appointment as assistant physician to the Royal Victoria Hospital in 1918. He became full physician in 1923–24 when he was given charge of wards. He had the rare gift in teaching of making difficult subjects plain to those less gifted, and his clinical lectures and demonstrations in the Royal Victoria Hospital were always crowded with eager students.

Though serious illness, which developed soon after he had been appointed professor, threatened for a time to cut short his career, he recovered and once more resumed his teaching and his hospital and private practice. Besides his work on war nephritis, he published papers on bronchial carcinoma and the renal aspects of essential hypertension. In 1939 he delivered the Lumleian lectures before the Royal College of Physicians, choosing as his subject Primary Carcinoma of the Lung.

Like many great men, he was simple in his tastes and modest to the point of self-effacement. However, this did not prevent his great gifts and kindly wisdom being sought in the service of many bodies, both lay and professional. He represented Queen's University on the General Medical Council. He was elected president of the Northern Ireland branch of the British Medical Association in 1932 and of the Irish Medical Schools' and Graduates' Association in 1936. In the following year he was elected president of the Ulster Medical Society. In 1948 he became a Deputy Lieutenant for the city of Belfast.

As a member of the Northern Ireland Hospitals Authority, Thomson worked without sparing himself to extend and improve the hospital and specialist services to which he had already contributed much of lasting value, and his fellow members have sent us the following tribute: "At all times Sir William's courtly manner, his innate kindness, and his invariable charm and good humour earned our love and confidence. In counsel he was wise and resourceful, in discussion calm, courteous, and considerate, in difficulty helpful and courageous, and at all times unselfish, gracious, and sincere. His integrity was a beacon to light the way to truth and his example was a great encouragement to all who lacked his long experience and wide knowledge."

In the last years of his life came his two final honours—a knighthood and election to the presidency of the Association of Physicians of Great Britain and Ireland, which set the seal on his professional career. "As Thomson never paraded his achievements," writes R. S. A., "many of the generations of students that he taught were only vaguely aware of the detailed brilliance of this great physician and scholar. To all of them, however, will remain the vivid memory of a kind friend and wise counsellor, who was never too busy to spare the time to greet, and if need be, help with his wise advice, any who came to him for it. In the examination and treatment of patients this human outlook was able to balance his professional genius with the real insight into human nature, without which medicine, at any time, loses more than half its value."

Thomson lived opposite the university campus, and he and his wife, formerly Miss Josephine Barron, kept open house for all. "Lady Thomson" writes a friend, "helped in his career more than most people knew. When he was incapacitated for three years by ulcerative colitis all the medical pundits said he would neither practise nor teach again; but Lady Thomson defied them, and he did." Their only child, Captain Humphrey Thomson, R.A.M.C., was killed during the Burma campaign, when he insisted on remaining with patients who were too ill to be moved when his hospital was evacuated.

J. H. B. writes: "Brilliant as his achievements have been as counsellor, administrator, physician, and teacher, it was as a man that Thomson appealed to all of us. He possessed a genuine charm, he was so essentially human, he treated his colleagues with an old-world courtesy, and he showed that curious blend of learning and culture which is oft-times developed in the good physician. The type of physician changes somewhat with the passing of generations, and many of us have felt that W. W. D. was one of the last of the Oslerian school. Like Osler, too, he was successful in the cultivation of such a measure of equanimity as enabled him to bear success with humility, the affection of his friends without pride, and to be ready when the day of sorrow and grief came—and as with Osler it came in the loss of an only son on the field of battle—to meet it with courage. All of us feel that he had found the answer to the prayer of Socrates for beauty in the inward soul and for unity of the outer and the inner man.

"His charity will be missed in the wards, his knowledge in the Faculty, his wisdom in the Senate, and his humanity by all."

ALEXANDER LOW

M.A., M.D., LL.D. ABERD.

Dr. Alexander Low, emeritus regius professor of anatomy in the University of Aberdeen, died on Nov. 15 at the age of 82.

He was born at Oldmachar in Aberdeenshire, where his father was a farmer. From Aberdeen Grammar School he entered Aberdeen University in 1886, and after taking his M.A. in 1891 he went on to take his medical degree, qualifying in 1894. He continued his studies at the universities of Freiburg, Vienna, and Zürich before joining the staff of the anatomy department at Aberdeen as assistant, later holding the posts of lecturer and reader. In 1912 he took his M.D. degree with highest honours. In 1925 he was appointed to the chair, and the university later conferred on him the honorary degree of LL.D.

G. A. G. M. writes: "Alexander Low's outstanding characteristics were gentleness and a modesty amounting almost to diffidence. It may be that his own congenital limb defect made him more sensitive to the failings, both physical and mental, of others, and that he was in consequence gentle and considerate to an unusual degree. However this may be, Low attracted to himself a depth of affection that was remarkable. He was a perfect example of the man who prefers to do good by stealth and who is embarrassed by its discovery; and not a few poor students during the past fifty years have benefited from his unostentatious help.

"All his long and active professional life was spent in the service of Aberdeen University, but he was so retiring and modest in all he said and did that it is perhaps not surprising that his true academic merits were sometimes better appreciated beyond the confines of his own school. In his earlier and formative years he spent several long vacations studying and investigating anatomy in Continental laboratories, and he had an enviable knowledge of German language and literature which he placed freely at the service of his more ignorant colleagues. His life work was coloured by his contacts with the embryological and anthropological giants of these days and his chief interests always lay in embryology and anthropology, a fact reflected in his publications.

"His researches were careful and polished, and anything he did, such as his work on the development of the mandible and the arrangement of fibres in the diaphragm, has survived almost intact the investigations of later workers. An acknowledged authority on remains of the Neolithic and Bronze Age periods, he had also been engaged for years in extensive anthropometric and other investigations of growing infants and of problems connected with twinning. After his retirement, he continued this work, often under great difficulties, especially during the war years. Most of his results are unpublished, but as similar figures concerning the growth of infants during the first 5–6 years of life probably do not exist, it is to be hoped that somehow they will not be lost.

"The twilight of Low's long life was burdened by increasing and trying infirmities, and the many who respected him so deeply are relieved to know that his fine and generous spirit is free at last."

WE have to record the death of a former member of our staff, Mr. E. M. RYDER, who served THE LANCET for 42 years from 1892 to 1934. Besides acting as personal secretary to Sir Squire Sprigge, he was long responsible for the collection of material for the Students' Guide, and for preparing New Inventions and New Preparations for the press. He had a talent for neat yet lucid description, as well as decided opinions on things and people; and if his manner sometimes intimidated his junior (and even senior) colleagues, it did not quite conceal his real affection for his chief and his care for the traditions of the journal. In leisure hours he was an interesting companion, whose mind remained alert to the end of his life. He died at his home at Wimbledon on Dec. 1, aged 83, and is survived by his daughter.

Appointments

CRICK, R. P., F.R.C.S., D.O.M.S.: asst. ophthalmic surgeon, Royal Eye Hospital, London.

FIELDING, WILLIAM, M.D. Manc., D.P.H.: deputy M.O.H., Sheffield.

KERSLAKE, D. M., M.B. Lond.: human physiologist, Royal Air Force Institute of Aviation Medicine, South Farnborough, Hants.

MARTIN, K. W., M.B. Lond., F.R.C.S.: senior registrar, St. Peter's and St. Paul's Hospitals, London.

NEWMAN, N., M.B., D.P.H.: asst. M.O.H., Hove, Sussex.

TINKER, CECILY, M.D. Lond., M.R.C.P.: senior registrar, Lancaster House Chest Clinic, Southend-on-Sea, Essex.

Notes and News

HAZARDS OF FLUID THERAPY

ADDRESSING the Manchester Medical Society's section of medicine on Nov. 1, Dr. D. A. K. Black referred to some of the dangers of indiscriminate treatment with intravenous fluids. Although the value of suitable treatment with saline or glucose solutions was well-established, their use might also give rise to harmful effects, which were the more dangerous in that they might come on insidiously. Despite Marriott's work, saline fluid was still given when a non-saline fluid would be more appropriate, and vice versa. Clinically, a complaint of thirst should suggest predominant water depletion, and signs of peripheral circulatory failure predominant salt depletion. The estimation of serum-sodium was the most direct biochemical method of distinguishing between salt and water depletion. The test for urinary chloride might be misleading in the presence of acidosis or alkalosis, or of renal or suprarenal disease.

Apart from giving the wrong type of fluid, it was also possible to give excessive amounts of the correct type of fluid. This was well appreciated with saline fluid, but the dangers of excessive intake of watery fluid were less well known. In anuria it was essential to restrict the intake of water as well as of salt; and there was also a risk of water intoxication in the period following surgical operations, in which, as Coller and his associates had shown, the elimination of water was seriously impaired. There was a danger of producing significant acidosis when large amounts of normal saline were given to correct salt depletion; in severe salt depletion it was better to give a fifth of the required sodium as lactate. When alkalosis was caused by excessive alkali administration, ammonium chloride could safely be given; but when alkalosis was due to vomiting, it was associated with salt depletion, and normal saline was more suitable than ammonium chloride. A low alkali reserve might be due to respiratory alkalosis, and not to metabolic acidosis; for example, in salicylate poisoning the low alkali reserve was a sign of respiratory alkalosis, and sodium bicarbonate might not be the best treatment. Caution was very necessary in the intravenous administration of potassium. Potassium infusions should be given very slowly, to avoid cardiac arrest, and the oral route was much to be preferred, whenever and as soon as practicable.

In conclusion, Dr. Black disclaimed any wish to set up a new specialty of applied electrolyteology, and suggested that those undertaking fluid therapy should ask themselves three questions, which could often be answered clinically: (1) Do we need to give fluid at all? (2) Do we give saline or non-saline fluid? (3) Have we given enough, or too much, fluid? Healthy kidneys were a great help in correcting mistakes in fluid administration, and after all most of the patients survived.

"UNESTABLISHED" GENERAL PRACTITIONERS

A WELL-ATTENDED meeting of unestablished general practitioners took place in London on Nov. 29. Dr. J. H. Edgar, who was in the chair, summarised a statement prepared by the committee which had arranged the meeting. Dr. Edgar advocated reduction of the maximum size of lists to 3000 patients, an expenses allowance of £600 to form part of the remuneration of all general practitioners, and removal of the restrictions on transfers. These proposals were designed to help the "squatter" and other principals with small lists. He went on to say that the system of assistantships without a view to partnership should be abolished; and meanwhile the conditions of employment of assistants should be safeguarded by Regulation. Lastly, he pointed out that doctors should be attracted to "undesirable" areas by financial inducement, and not forced there by economic pressure. In the subsequent discussion two points were emphasised: (1) that the transfer regulation was an intolerable obstacle to the small-list practitioner and the would-be principal, many speakers indicating that it had already caused them hardship; and (2) that the system of permanent assistantships without a view to partnership had no place in the National Health Service. Dr. Edgar declared that the number of assistantships with a view had dropped to 60% of that in the previous year, and that the intake of new patients by "squatters" had fallen to 15% of the number prior to the transfer restrictions.

Dr. Edgar, speaking on behalf of the organising committee, suggested that adequate representation of unestablished practitioners could best be achieved by the formation of a special group of the British Medical Association. In the discussion it became apparent that there were three arguments in favour of this: maintenance of the unity of the profession, simplicity of organisation, and the possibility of direct representation on the General Medical Services Committee. Nevertheless, there was a definite body of opinion in favour of a separate association. A resolution for an application to the council of the British Medical Association for the formation of a special group was carried by a substantial majority.

SYRINGES FOR INSULIN INJECTION

A NEW British standard for hypodermic syringes for insulin injection has been published. This standard (B.S. 1619/1950) is based on the standard for hypodermic syringes for use in medical and surgical practice (B.S. 1263), and covers all-glass as well as metal-and-glass syringes. The specification is designed to cater for the special requirements of diabetics who normally perform their own injections; and the scale is marked in twentieths of a millilitre, to enable them to estimate more readily their dosage requirements. Two sizes of syringe are given, with nominal capacities of 1 ml. and 1·5 ml. Dimensions of the conical tip are given exactly, being identical with, and interchangeable with, the American Luer tip (as in B.S. 1263). Copies of this standard may be obtained (price 2*s.* 6*d.*) from the sales department, British Standards Institution, 24, Victoria Street, London, S.W.1.

BLINDNESS DUE TO HEREDITARY DISEASE

IN Norway, Holst[1] has investigated the causes in 3181 cases of blindness. Among this total those who become blind in old age may not be fully represented, for members of this group are commonly overlooked; and this must be borne in mind in judging his observation that almost half (1585) of the 3181 cases were due to hereditary disease. Earlier surveys have suggested that hereditary disease is the cause in a much smaller proportion—one-third or less. Holst's records of blindness due to hereditary disease include 102 cases of congenital atrophy of the optic nerve, 263 of retinitis pigmentosa, 304 of congenital cataract, and 145 of glaucoma simplex. He is prepared to defend his inclusion of glaucoma simplex among the hereditary causes; but he is more diffident about including 33 cases of senile cataract. As regards prevention, Holst remarks that Hitler's pseudo-scientific experiments in genetics may have spoiled the prospects of practical work in this field for a long time to come; but we must continue to face the possibility of sterilisation or a ban on the marriage of persons with a family history of hereditary blindness, taking each case on its merits. In Norway between 1945 and 1949 four women and one man were sterilised with a view to preventing blindness in the next generation. As for the non-hereditary cases, Holst draws attention to the importance of methanol, which accounted for 42 of the 50 cases due to poisoning.

REGIONAL CHILD-HEALTH SURVEY

SOMETHING new in regional surveys has been undertaken by Prof. John Craig and Dr. Joan Burrell. In their review of child life and health in the North-Eastern (Aberdeen) Region of Scotland,[2] they outline the pædiatric services and, with special reference to the year 1948, report on the children's health so far as this can be judged from official medical reports, hospital admissions, and mortality-rates. The region, with a population of 501,000, includes the island counties of Orkney and Shetland—isolated communities which contrast in many ways with the mainland area. One point that emerges from an analysis of the number of mental defectives in the various parts of the region, and of the facilities provided for them, is that only Aberdeen City gives adequate special education to the educable members of this group, and that in all areas there is a lamentable lack of homes for the non-educable. An account of the development of the teaching of child health includes the observation that "teaching and research determine the character of the care of children, and

1. Holst, J. C. Blindhetsaarsaker i Norge: En Oversikt Utarbeidet av Øienlæge. Oslo, 1950.
2. Pædiatrics in the North-Eastern (Aberdeen) Region of Scotland. By John Craig, M.B., F.R.C.P.E., professor of child health, and Joan Burrell, M.B., D.R.C.O.G., assistant in child health, University of Aberdeen. Aberdeen: University Press. 1950. Pp. 47.

each of these three is the better for its association with the other two." The authors suggest that "in a satisfactory health service the family doctor should play an even more important part than in the past, because the real battle for the child's health is fought in the home and the family doctor is most familiar with the social and environmental conditions." Furthermore, health centres, by providing for family doctors, school and child-welfare clinics, health visitors, and district nurses, should promote coöperation between family doctors and local-authority workers and thus enhance the efficiency of the child-health service. The need for more and better buildings in this region (as in most) is clamant, but "though better buildings are needed the doctors and nurses and their helpers are more important than the walls within which they work." This well-balanced survey will doubtless be the forerunner of others.

University of Cambridge

The Raymond Horton-Smith prize for 1949–50 has been awarded to Dr. A. G. E. Pearse, Trinity College, for his essay on Cytochemistry and Secretory Cytology of the Anterior Hypophysis. Dr. B. G. Parsons-Smith, Trinity College, was the runner-up with an essay on the Value of Electro-encephalographic Study in Cases of Cerebral Tumour.

University of London

The title of reader in anatomy in the university has been conferred on Dr. R. J. Harrison in respect of his post at Charing Cross Hospital Medical School.

Royal College of Surgeons of England

A series of exhibitions and demonstrations are being held in the college on Dec. 13, the day of the annual meeting of fellows and members. In the department of physiology there will be an exhibition and demonstration of the scientific equipment; and the department of pathology will show recently acquired specimens illustrated by photomicrographs, microradiographs, and radiographs including groups illustrating diseases of the vertebral column, treatment of malignant disease of the bony pelvis by hind-quarter amputation, and visceral hydatid disease. The department of anatomy will also display recent specimens, including dissections of the binturong ("Whiskers" from the Zoo), the neck of the darter, and the submandibular glands of the tamandua. New additions to the odontological collection will also be on view. Among research exhibits will be preparations showing the development of the ureter, the comparative anatomy and physiology of the subepithelial system, and human lungs injected with Marco resin, together with models showing the development of the lung of a child. The general department will show some of the college plate and a selection of the illuminated addresses presented in connection with the 150th anniversary. In the library there will be shown recent acquisitions of historical and new books, gifts of autograph letters and bookplates, selections from the collection of engravings, and biographies of fellows. The exhibitions will be open from 2 P.M. onwards. Mr. William Doolin will give the Thomas Vicary lecture at 4 P.M., and the meeting of fellows and members will be held at 5.30 P.M.

Infectious Tuberculous in London

The Minister of Health has approved in principle the provision by London County Council of hostel accommodation for people with tuberculosis who are infectious but are unlikely to benefit by further sanatorium treatment and who have either no home or no suitable home. The Minister's approval is given on the understanding that the cost shall not increase the Council's total expenditure under Part III of the National Health Service Act. Earlier, the Minister rejected a plan to construct on the site of St. Peter's Hospital, Stepney, a night sanatorium and industrial workshops (see *Lancet*, Oct. 28, 1950, p. 491).

Supplies of Aureomycin

A plant for the production of 'Aureomycin' is nearing completion at Hirwaun, South Wales. At this plant, which is being built by the Lederle Laboratories division of Cyanamid Products Ltd., work will be confined to purifying crude aureomycin and encapsulating and packaging the refined product. Production is expected to satisfy domestic demands as well as providing for exports. The company is investigating the possibility of creating in Britain a plant for the complete manufacture of this antibiotic.

Royal Society

On Nov. 30 Prof. E. D. Adrian, O.M., was elected president of the society.

Professor Adrian became president on his 61st birthday. He has held the Foulerton research professorship of the society and he is professor of physiology in the University of Cambridge, where, except for his hospital work at Barts as a student, and his service in world war I, he has worked since his student days. A pupil of the late Dr. Keith Lucas, he has continued and amplified the work of that pioneer in neurophysiology, and he was awarded the Nobel prize in medicine in 1932. For many years he has served on the committee of the Physiological Society; he has acted as its secretary for 3 years; and he was editor of the *Journal of Physiology* for 10 years. In 1942 he was appointed to the Order of Merit. His other distinctions include the Royal medal (1934), the Copley medal (1946), the Croonian lectureship (1931), the Ferrier lectureship (1938), and the Baly medal (1929). His published papers deal mostly with the properties of nerve-fibres and with investigations on the central nervous system. Electro-encephalography rests almost entirely on his fundamental investigations; and he was largely responsible for the development of techniques by which the passage of the sensory impulses may be traced from the sensory nerve-endings to the cerebral cortex.

Dr. I. de Burgh Daly, Prof. Wilson Smith, and Dr. V. B. Wigglesworth were elected members of the council of the society.

Fluoride in Drinking-water

The American Water Works Association convention in Detroit was told by Dr. Chester Tossy that at Grand Rapids, Michigan, putting fluoride in the drinking-water for the last six years had reduced dental caries by more than 60%. He also said, according to B.U.P., that within the next ten years most U.S. cities would be adding fluoride to their drinking-water; the cost to each ratepayer was only about 2*d*. a year. Dr. A. P. Black, of the University of Florida, suggested that fluorination of drinking-water was "the biggest step in public health in the last hundred years."

Beds in Swiss Sanatoriums

The members of the clinical team who will shortly visit Switzerland to study the medical facilities available there for the treatment of patients with pulmonary tuberculosis are: Dr. M. A. Foulis, physician superintendent, Robroyston Hospital, Glasgow; Dr. R. Y. Keers, medical director, British Red Cross Sanatoria in Scotland; Miss G. M. M. Carter, matron, East Fortune Sanatorium, East Lothian; Dr. I. M. Macgregor, medical officer, Department of Health for Scotland.

Their visit arises out of the preliminary inquiries into sanatoria facilities carried out by officers of the Department of Health for Scotland at the beginning of November. On their return Miss Margaret Herbison, joint parliamentary under-secretary of State for Scotland, announced that their report was sufficiently encouraging to justify a visit by clinical experts.

New Science Centre

In his farewell address as president of the Royal Society, Sir Robert Robinson announced that the following scientific societies were taking part in the new centre: Biochemical Society; British Association; Chemical Society; Faraday Society; Geological Society; Linnean Society; London Mathematical Society; Physical Society; Physiological Society; Royal Anthropological Institute; Royal Astronomical Society; Royal Meteorological Society; Royal Society; Royal Statistical Society; Society of Chemical Industry. Many of the smaller scientific societies and clubs would continue to receive hospitality. "I am disappointed," he added, "that it is not possible for me to enlarge on the contribution which the science centre building should make to the aspect of the new London. Nor can I expatiate on the famous landmarks that may be visible from its windows. Suffice it to say that we believe the site, when finally selected and approved, will be found to be entirely satisfactory, not only in area, but also in position. There is no doubt that it will offer a great opportunity to an imaginative architect and it will be easily accessible from other parts of London. . . . It is probable that the scientific societies will be housed in a worthy and impressive building, such a one as could look Somerset House in the face, and it is agreed that this will have the most prominent position on the site. The quarters for the various societies will be separate, with their own entrances, very much in the same way as here at Burlington House." He hoped the tercentenary of the foundation of the Royal Society in 1960 would be celebrated in their new home.

Royal Society of Medicine

On Dec. 1, Lord Webb-Johnson presented the Henry Hill Hickman medal to Dr. R. J. Minnitt at a meeting of the anæsthetics section of the society.

Medical Honour

The King has appointed Surgeon-Lieutenant D. S. Macphail to be a member of the military division of the Order of the British Empire:

"for courage, skill and determination when he was dropped by parachute into Yugoslavia in May, 1944, and, in spite of the very primitive conditions and the scarcity of medical supplies established a hospital for the Partisans."

Royal Sanitary Institute

The health congress of the institute will be held at Southport next year from April 23 to 27. The following presidents of sections have been appointed: Sir John Charles (preventive medicine), Prof. T. H. Davey (tropical hygiene), Dr. A. Massey (hygiene in industry). Further particulars may be had from the Institute, 90, Buckingham Palace Road, London, S.W.1.

Manx Chemists

The 34 chemists on the Isle of Man who withdrew from the health service on Nov. 13 have now accepted the prescription and container charges which were the cause of their dispute with the Health Services Board. It is understood that they have received an assurance that in future they will be given prior notice of any new regulations affecting the pharmaceutical service. The board's decision to debit 6*d*. to the chemists' accounts for every prescription dispensed by them between Oct. 1 and Nov. 13 is to be the subject of negotiation. During the 18 days of the "strike," the 7 chemists who remained in the service dispensed about 150 prescriptions a day between them: these were collected and distributed by the police authorities.

Medical Inspectorate of Mines

Dr. T. E. Howell has been appointed principal medical inspector of mines in succession to Dr. S. W. Fisher, who has retired on reaching the age-limit.

Dr. Howell was born in 1900 near Risca, Monmouthshire, and attended various village schools before serving with the Royal Air Force during the 1914–18 war. Before beginning to study medicine he worked for some years in the coal-mining industry and he obtained a first-class mine manager's certificate. In 1934 he qualified from Guy's Hospital and three years later took his M.B. Lond. After a period in general practice he returned to Guy's as registrar and chief clinical assistant to outpatients, at the same time holding the post of pathologist to the Evelina Hospital for Sick Children. In 1938 he joined the factory department of the Home Office as medical inspector of factories in charge of the south-western region. After five years, during which time he was also lecturer in industrial medicine at Bristol University, he left the factory department to join the Ministry of Fuel and Power as deputy chief mines medical officer. For several months during 1946 he was loaned to the Ministry of Labour to deal with difficulties in connection with recruitment of miners for work in the Ruhr coal-fields, and he recently represented the Ministry at a congress of industrial medical officers in Vienna. His interests, apart from his work, are animal genetics and farming.

Births, Marriages, and Deaths

BIRTHS

BAILIE.—On Nov. 29, in Belfast, the wife of Mr. H. W. C. Bailie, F.R.C.S.E.—a son.

CLAREMONT.—On Nov. 25, in London, the wife of Dr. Hugh Claremont—a son.

GLADSTONE.—On Nov. 27, at Woodstock, the wife of Dr. G. P. Gladstone—a daughter.

HADFIELD.—On Nov. 24, in London, the wife of Dr. Gordon Hadfield—a daughter.

LAUBER.—On Nov. 24, in London, the wife of Dr. H. C. Lauber—a son.

POMFRET.—On Dec. 2, at Southsea, the wife of Surgeon Captain A. A. Pomfret, O.B.E., R.N.—a son.

MARRIAGES

MANSON-BAHR—GROSSMITH.—On Nov. 25, at Tandridge, Sir Philip Manson-Bahr, M.D., to Edith Mary Grossmith.

NEWTON—ROMANES.—On Nov. 25, at Brockham Green, William Boyd Newton, M.D., to Sheila Margaret Stewart Romanes.

SMELT—KNIGHT.—On Nov. 25, at Warblington, Hants, Charles Michael Casterton Smelt, captain, R.A.M.C., to Joan Anne Rosemary Knight.

WARLOW—OAKLEY.—On Dec. 2, in London, Allan Llewellyn Warlow, M.R.C.S., to Joan Astrid Oakley.

DEATHS

BARFORD.—On Nov. 29, James Leslie Barford, M.R.C.S., D.P.M.

DEMPSEY.—On Nov. 25, in Dublin, Timothy Gerard Dempsey, M.B. N.U.I.

EVANS.—On Nov. 26, Jessie Downie Granger Evans, M.D. Lausanne.

HUTCHINSON.—On Dec. 2, at Bury, Lancs, Gladys Hilda Hutchinson, M.B. Manc.

Diary of the Week

DEC. 10 TO 16

Monday, 11th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.1
8.30 P.M. Pathological meeting.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
4.30 P.M. Sir Leonard Parsons, F.R.S.: Historical Background: the Unborn Child. (First Harben lecture.)

Tuesday, 12th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene, Keppel Street, W.C.1.) Dr. K. W. Donald: Definition and Assessment of Respiratory Function. (First lecture.)

CHELSEA CLINICAL SOCIETY
7 P.M. (47, Queen's Gate Terrace, S.W.7.) The Very Rev. Hewlett Johnson, D.D.: Health and Education East of the Iron Curtain.

INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5 P.M. Dr. J. O. Oliver: Pathology.

CIBA FOUNDATION, 41, Portland Place, W.1
5 P.M. Sir Stanton Hicks: The Rôle of Suprarenal Cortical Function in Disorders of Childhood.

PADDINGTON MEDICAL SOCIETY
8.30 P.M. (St. Mary's Hospital, W.2.) Prof. C. A. Pannett: Restraint in Surgery.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE
4.30 P.M. Sir Leonard Parsons: The Newborn Child and the Infant. (Second Harben lecture.)

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE
5 P.M. (Edinburgh University Anatomy Theatre.) Prof. H. L. Sheehan: Renal Cortical Necrosis.

Wednesday, 13th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
4 P.M. Mr. William Doolin: Dublin's Surgeon-Anatomists. (Thomas Vicary lecture.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE
4.30 P.M. Sir Leonard Parsons: The Older Child: a Glance into the Future. (Last Harben lecture.)

INSTITUTE OF DERMATOLOGY
5 P.M. Dr. C. W. McKenny: X-ray Technique.

ASSOCIATION OF SEA AND AIR PORT HEALTH AUTHORITIES
11.30 A.M. (90, Buckingham Palace Road, S.W.1.) Dr. Mary Lennox: Publicity and Port Health.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow, C.2
5 P.M. Professor Sheehan: Renal Cortical Necrosis. (Weild lecture.)

Thursday, 14th

ROYAL COLLEGE OF SURGEONS
3 P.M. Prof. L. Witts: Ocular Aspects of Blood Dyscrasias.

UNIVERSITY OF LONDON, Senate House, W.C.1
5.30 P.M. Sir Stanton Hicks: Food and Folly. (Sanderson-Wells lecture.)

BRITISH POSTGRADUATE MEDICAL FEDERATION
5 P.M. Dr. Donald: Definition and Assessment of Respiratory Function. (Second lecture.)

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, S.W.1
4.30 P.M. Dr. Anthony Feiling: Neurology lecture-demonstration.

INSTITUTE OF DERMATOLOGY
5 P.M. Dr. E. J. Moynahan: Bites and Stings.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26 Portland Place, W.1
7.30 P.M. Dr. J. R. Audy: Scrub Typhus in Burma and Malaya.

ALFRED ADLER MEDICAL SOCIETY
8 P.M. (11, Chandos Street, W.1.) Dr. Edward F. Griffith: Initiation.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney Green, E.1
3 P.M. Clinical meeting.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Dr. R. E. Rewell: Pathology of Captive Wild Animals.

TORQUAY AND DISTRICT MEDICAL SOCIETY
8.30 P.M. (Torbay Hospital, Torquay.) Mr. Norman Lake: Surgical Aspects of Hypertension.

HONYMAN GILLESPIE LECTURE
5 P.M. (Edinburgh University Anatomy Theatre.) Dr. J. G. McCrie: Reflections from a Provincial Deanery.

Friday, 15th

MAIDA VALE HOSPITAL MEDICAL SCHOOL, Maida Vale, W.9
5 P.M. Mr. Valentine Logue: Clinical neurological demonstration.

INSTITUTE OF OPHTHALMOLOGY, Judd Street, W.C.1
5.30 P.M. Mr. G. I. Scott: Clinical Perimetry.

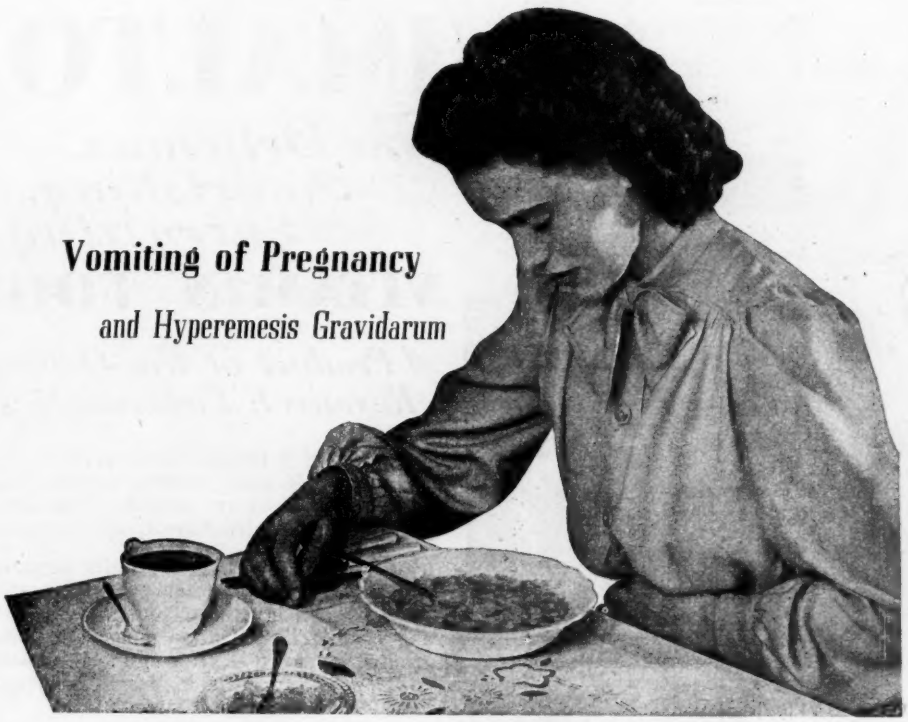
BIOCHEMICAL SOCIETY
2 P.M. (Department of Biochemistry and Chemistry, Medical College, St. Bartholomew's Hospital, E.C.1.) Short papers.

UNIVERSITY OF EDINBURGH, New Buildings, Teviot Place, Edinburgh, 8
2.30 P.M. Prof. Ian Aird: Surgical Exposure of the Pancreas. (Macarthur lecture.)

FACULTY OF RADIOLOGISTS
2.15 P.M. *Diagnosis Section* (Royal College of Surgeons). Dr. R. A. Kemp Harper, Mr. I. G. Williams: Thymic Tumours in Myasthenia Gravis.

Saturday, 16th

ASSOCIATION OF BRITISH NEUROLOGISTS
10 A.M. (National Hospital, Queen Square, W.C.1.) Dr. E. C. Lumsden: Basic Problems in the Pathology of Disseminated Sclerosis and Demyelinating Disease. (First Florence Tong lecture.)



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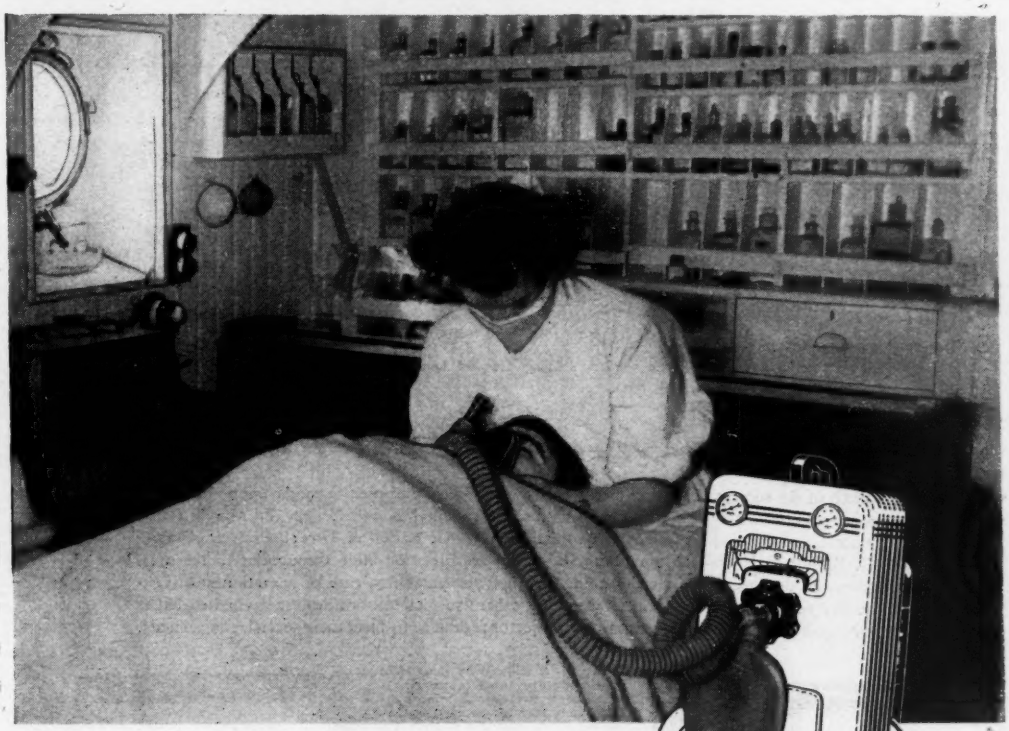

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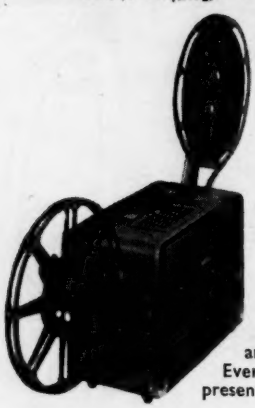

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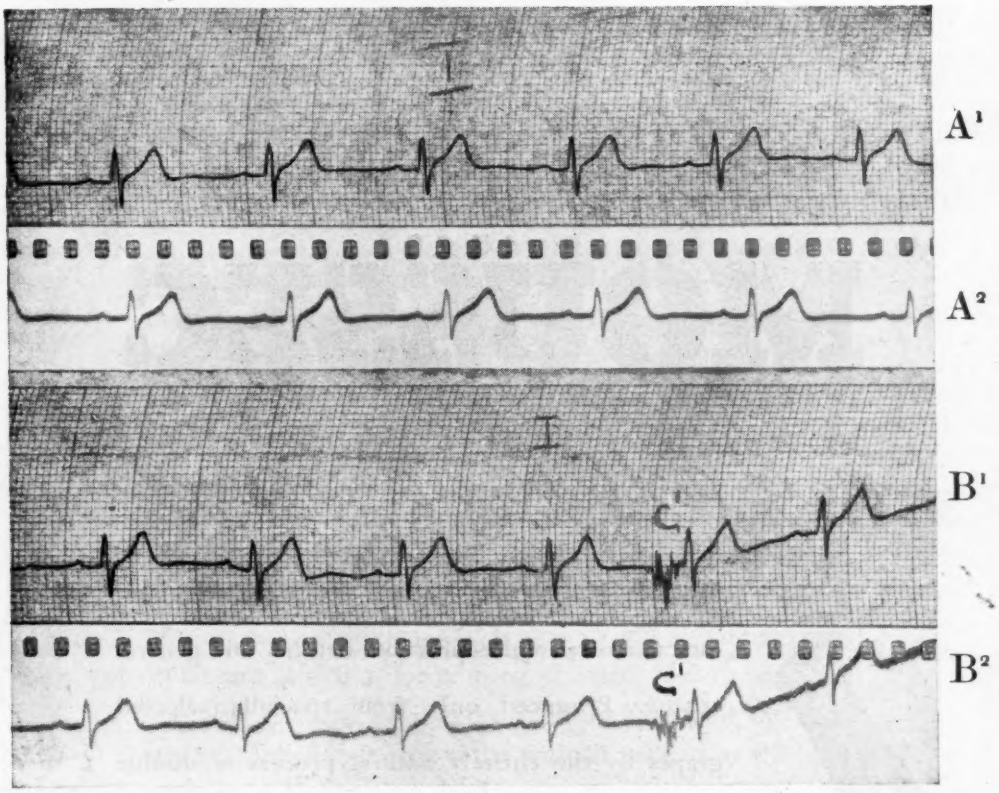

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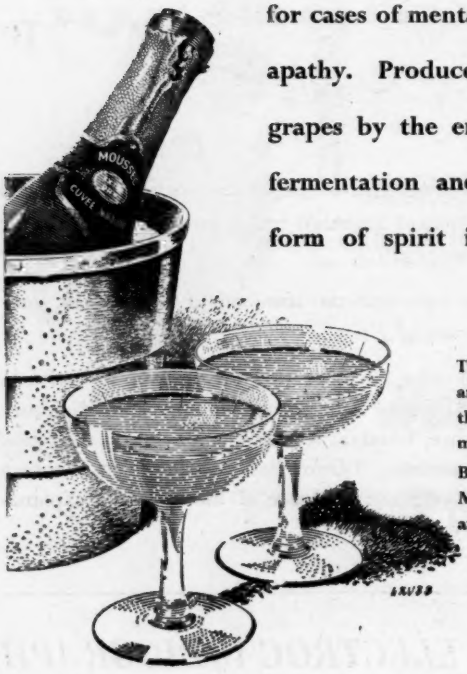

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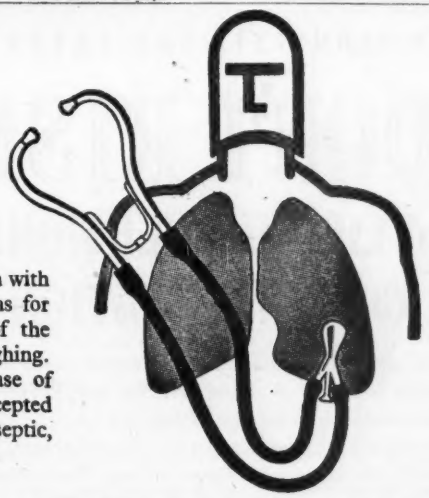

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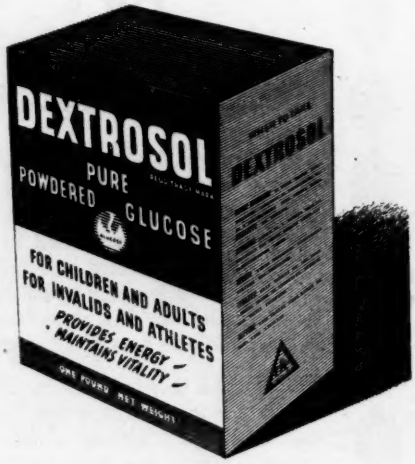

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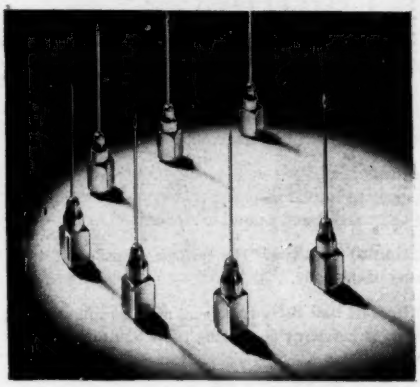

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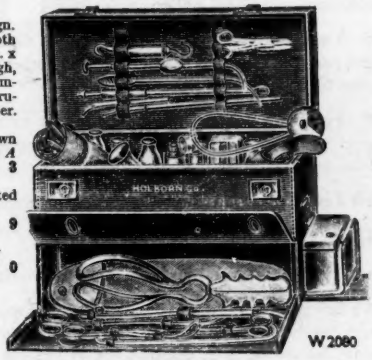

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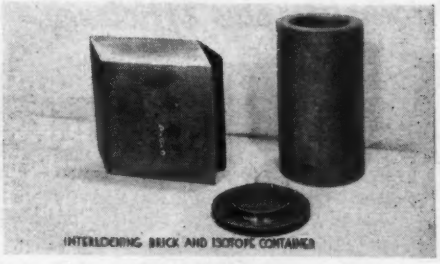

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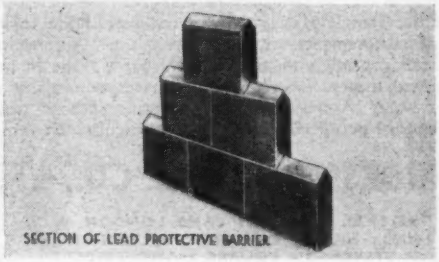

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Fee (both parts) 4 guineas; single part 2 guineas. For practitioners under National Health Service Act fee will normally be paid by Ministry of Health, together with (where applicable) expenses according to approved scale.

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A course of instruction in Radiotherapy will begin at the Christie Hospital and Holt Radium Institute, Manchester, on 1ST APRIL, 1951. This will continue for approximately 9 months, after which students must still spend a further 15 months working either in the Holt Radium Institute or in another approved hospital. Inclusive fee £52 (52 pounds). Lectures and practical demonstrations will be given in the following subjects:—

Physics as Applied to Radiotherapy	W. J. MEREDITH and Physics Staff
Biological Effects of Radiation	Dr. E. PATERSON and Dr. W. M. DALE
Principles and Practice of Radiotherapy	Dr. RALSTON PATERSON and Radiotherapy staff
Pathology in relation to Radiotherapy	Dr. H. RUSSELL and Dr. R. M. TAYLOR

Candidates accepted for the course become eligible applicants for a limited number of Junior Registrar appointments under the National Health Service. Special consideration will be given to candidates possessing a higher qualification in medicine or surgery (for whom posts as Registrars may be available).

Further information may be obtained from the Director, Holt Radium Institute, Wilmslow-road, Manchester, 20. Applications must be sent to the Dean of the Medical School, University of Manchester, and all applicants will be required to attend for interview.

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A 3-months' course of Postgraduate Surgery is arranged to start on 26TH MARCH, 1951. It is suitable for surgeons requiring a refresher course in the current outlook on general surgery, or for graduates preparing to specialise in surgery; approximately 275 hours of instruction are provided. A similar course will be held starting on 1st October, 1951. Fee £31 10s.

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A 3 months' course in Applied Anatomy, Physiology, Pathology, Bacteriology, and Biochemistry will begin on 2ND JULY, 1951. This course is suitable for postgraduates wishing to take the Primary Fellowship examination, as a final preparation in these subjects. Considerable basic knowledge is highly desirable prior to taking this course. Fee £31 10s.

Applications for enrolment to Director of Postgraduate Studies, Surgeons' Hall, Edinburgh, 8. Applicants for courses should supply particulars of qualifications and postgraduate experience.

ASSOCIATION OF BRITISH NEUROLOGISTS

President: Dr. F. M. R. Walshe, F.R.S.

The first FLORENCE TONG LECTURE will be given on SATURDAY, 16TH DECEMBER, 1950, at 10 A.M. in the Lecture Theatre, National Hospital, Queen-square, W.C.1, by Dr. E. C. LUMSDEN (Aberdeen). Subject: "Basic Problems in the Pathology of Disseminated Sclerosis and Demyelinating Disease." Admission free.

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ANATOMY, PHYSIOLOGY AND PATHOLOGY OF JOINTS
15TH–23RD JANUARY, 1951

Monday, 15th January, Great Portland-street		
10.00 A.M.	Anatomical and Physiological Principles	Prof. D. V. DAVIES
11.45 A.M.	Chemistry of Synovial Fluid	Dr. T. F. DIXON
12.45 P.M.	Lunch	
1.45 P.M.	General Pathology of Joint Structures	Dr. H. A. SISSONS
4.00 P.M.	Tea	
4.30 P.M.	Anatomy of Pectoral Girdle	Dr. J. JOSEPH
Tuesday, 16th January, Country Branch, Stanmore		
10.30 A.M.	Congenital Dislocation of Joints	Mr. H. J. SEDDON Mr. D. TREVOR
12.45 P.M.	Lunch	
1.45 P.M.	Infection of Joints	Dr. C. H. LACK Mr. G. BLUNDELL JONES
4.00 P.M.	Tea	
Wednesday, 17th January, Great Portland-street		
10.00 A.M.	The Shoulder Capsule	Mr. V. H. ELLIS
11.15 A.M.	Recurrent Dislocation of the Shoulder	Mr. V. H. ELLIS
12.45 P.M.	Lunch	
1.45 P.M.	Clinical Demonstration	Mr. H. J. SEDDON
4.00 P.M.	Tea	
4.30 P.M.	Anatomy and Function of the Hip	Dr. J. JOSEPH
Thursday, 18th January, Country Branch, Stanmore		
10.00 A.M.	Clinical Demonstration	Mr. J. A. CHOLMELEY
12.45 P.M.	Lunch	
1.45 P.M.	Coxa Vara	Mr. K. I. NISSEN
4.00 P.M.	Tea	
Friday, 19th January, Country Branch, Stanmore		
10.00 A.M.	Tuberculosis Symposium	Mr. H. J. SEDDON
12.45 P.M.	Lunch	Mr. J. A. CHOLMELEY
1.45 P.M.	Tuberculosis Symposium (cont.)	Dr. F. H. STEVENSON Dr. C. H. LACK Dr. H. A. SISSONS
4.00 P.M.	Tea	
Saturday, 20th January, Great Portland-street		
10.00 A.M.	Anatomy of the Knee	Dr. J. JOSEPH
11.00 A.M.	Neuropathic Joints	Mr. A. T. FRIPP
Monday, 22nd January, Great Portland-street		
10.00 A.M.	Movements of Joints	Dr. J. JOSEPH
11.15 A.M.	Ankylosis	Mr. R. Y. PATON
12.45 P.M.	Lunch	
1.45 P.M.	Osteo-arthritis	Dr. H. A. SISSONS
3.00 P.M.	Mechanical Derangement of Joints	Mr. J. I. P. JAMES
4.00 P.M.	Tea	
5.00 P.M.	Pain referred from Joints	Dr. P. H. SANDIFER
Tuesday, 23rd January, Great Portland-street		
10.00 A.M.	Rh.A. (Pathology)	Dr. H. A. SISSONS
11.00 A.M.	Rh.A. and Gout	Dr. R. NASSIM
12.45 P.M.	Lunch	
1.30 P.M.	Surgical Anatomy of the Spine and Weight Transmission	Dr. J. JOSEPH Mr. J. I. P. JAMES Mr. P. H. NEWMAN
4.00 P.M.	Tea	
5.00 P.M.	Ankylosing Spondylitis	Prof. B. W. WINDEYER

The fee for the course, including lunch and tea, is 10 guineas.

Early application should be made to the Dean at 234, Great Portland-street, London, W.1.

INSTITUTE OF UROLOGY

in association with
ST. PETER'S AND ST. PAUL'S HOSPITALS

INTENSIVE POSTGRADUATE COURSE OF UROLOGICAL INSTRUCTION
8TH JANUARY, 1951–26TH JANUARY, 1951

The course will include systematic lectures, covering the whole subject of urology, outpatients sessions, ward visits, operation sessions, and tutorial demonstrations. All postgraduates taking the course are expected to attend lectures, and may attend all tutorial demonstrations. They will be allotted individually to outpatient sessions, ward visits, and operation sessions.

The fee for this course is 10 guineas, payable in advance.

Applications should be made to the Secretary, Institute of Urology, St. Peter's Hospital, Henrietta-street, London, W.C.2.

THE INSTITUTE OF LARYNGOLOGY AND OTOLOGY

UNIVERSITY OF LONDON
330–332, Gray's Inn-road, London, W.C.1

The clinical part of a COMPREHENSIVE COURSE (especially suitable for students preparing for Part II of the D.L.O Examinations) commences on 1ST JANUARY, 1951, and continues until 18th May.

The course is a full-time one and covers the whole of the clinical aspects of the specialty.

Full particulars obtainable from the Dean.

THE LONDON HOSPITAL MEDICAL COLLEGE

COURSE IN ADVANCED SURGERY

A Postgraduate Course in Surgery for final examination of the F.R.C.S. will be held at The London Hospital from 5TH MARCH, 1951 to 21ST APRIL, 1951. There will be a break of 1 week over Easter. Organised classes will be held every afternoon of the week, Saturdays and Sundays excepted. During the course postgraduate students attending the classes will be welcome at the general teaching in the outpatient departments and in the operating-theatres. The course will be strictly limited to 24 students and will be mainly devoted to clinical surgery. The fee for external candidates will be 20 guineas and for "Old Londoners" 12 guineas.

Applications should be made to the Dean, from whom further particulars can be obtained.

CIBA FOUNDATION

For the Promotion of International Coöperation in Medical and Chemical Research

The SECOND LECTURE will be given by Prof. Sir C. STANTON HICKS, M.D., M.SC., PH.D., F.R.I.C., Professor of Human Physiology and Pharmacology, University of Adelaide. Subject: "The Rôle of Suprarenal Cortical Function in Disorders of Childhood." At 5 P.M. on TUESDAY, 12TH DECEMBER, 1950, at 41, Portland-place, W.1. Chairman: The Right Hon. Lord Horder, G.C.V.O.

Admission free, by ticket obtainable on application to—
G. E. W. WOLSTENHOLME,
Secretary to the Executive Council.

ASTLEY COOPER STUDENTSHIP

GUY'S HOSPITAL

This Studentship, tenable at Guy's Hospital Medical School, will become vacant on 1ST JANUARY, 1951.

The student, who is called the "Astley Cooper Assistant to the Curator of the Gordon Museum," will be elected for a period of 3 years.

Particulars regarding the Studentship can be obtained from the Secretary to the Astley Cooper Trustees, Medical School Office, Guy's Hospital, S.E.1, to whom applications for the post should be addressed on or before 20th December, 1950.

L.M.S.S.A.

FINAL EXAMINATION: SURGERY, 8th January, 12th February, 12th March, 1951. MEDICINE, PATHOLOGY, 15th January, 19th February, 19th March, 1951. MIDWIFERY, 16th January, 20th February, 20th March, 1951. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

GUY'S HOSPITAL MEDICAL SCHOOL, S.E.1. Applications invited for appointment of ASSISTANT to the Director of the Department of Pædiatrics. Appointment is for 2 years in the first instance, to commence as soon as possible. Applicants should hold the M.D. or M.R.C.P. Salary £1250–£1750 p.a., with superannuation and family allowance.

Copies of standing orders are obtainable from the Dean, to whom applications should be forwarded by 12th December, 1950.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE. UNIVERSITY OF LONDON, Keppel-street, Gower-street, W.C.1. Applications are invited for the 3 posts of JUNIOR LECTURER IN TROPICAL MEDICINE, PROTOZOOLOGY, AND HELMINTHOLOGY. Appointment is for 2 years in the first instance.

Tropical Medicine. Medical qualification and knowledge of tropical medicine essential. Teaching experience desirable. Salary £900 p.a.–£100 p.a.–£1100 p.a.

Protozoology and Helminthology. Medical, veterinary medical, or zoology (Hons.) qualification required. Experience of teaching and research desirable. Salary (medical) £900 p.a.–£100 p.a.–£1100; (non-medical) £600 p.a.–£50 p.a.–£750.

Applications addressed to the Dean, stating age, qualifications, experience, &c., should reach the School not later than 28th February, 1951.

UNIVERSITY COLLEGE LONDON. Student Health ASSOCIATION. ASSISTANT MEDICAL OFFICER (part-time), 2 or 3 sessions weekly during term. The work consists of prophylactic medical examinations and general consultations. Salary will be at rate of £2 10s. per session (morning or afternoon).

Applications to Chairman, Student Health Association, University College London, by 20th December, 1950. Any details from the Physician (EUSton 4400. Ext. 210).

UNIVERSITY OF GLASGOW. Applications invited for appointment to the GARDINER CHAIR OF BACTERIOLOGY, which will become vacant on 30th September, 1951. The Gardiner Professor is also Bacteriologist to the Glasgow Western Hospitals, which appointment carries Consultant grading. A medical qualification is essential. Salary will be on the University scale for professors in clinical departments.

Further particulars may be obtained from undersigned, with whom applications (20 copies) should be lodged by 30th January, 1951. ROBT. T. HUTCHESON, Secretary of University Court.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for the post of SENIOR LECTURER in the Department of Pathology. The duties of the post will include pathological work in the University College Hospital and instruction in morbid anatomy of students working for the medical degrees of the University of London. The salary scale is £1200–£50–£1600, and the point of entry in the scale is determined by qualifications and experience. Child allowance is paid and also a temporary cost-of-living allowance. Superannuation is under F.S.S.U. arrangements. Unfurnished accommodation is available at a rent of 5% of salary. The successful applicant will be expected to take up the post during October, 1951.

Applications (12 copies), giving full particulars of qualifications, and names of 3 referees, should be received before 31st January, 1951, by the Secretary, Senate Committee on Higher Education in the Colonies, Senate House, University of London, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF ADELAIDE, Australia. Applications are invited for appointment as READER IN PATHOLOGY. Salary range £A1050–£A25–£A1200.

General conditions of appointment together with information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon-square, London, W.C.1. The closing date for the receipt of applications is 31st January, 1951.

DALHOUSIE UNIVERSITY. Assistant Professor of ANATOMY, Medical Faculty. Salary $3000–$4000, depending on qualifications.

Apply to H. G. GRANT, M.D., Dean, The Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia, Canada.

UNIVERSITY OF OTAGO, Dunedin, New Zealand. MEDICAL SCHOOL. Applications are invited for the position of SENIOR LECTURER IN CHEMICAL PATHOLOGY. Duties will include teaching and supervision of chemical pathology in the clinical laboratories under the direction of the Professor of Pathology. Excellent research facilities are available. Applicants should possess a medical qualification. Salary scale is £1450–£1750 (N.Z.). The commencing salary may be above the minimum according to qualifications and experience.

Further particulars and information as to method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon-square, London, W.C.1. Applications close on the 1st February, 1951.

Hospital Services : Senior Appointments

For appointment of Part-time Assistant Psychiatrist (Senior Hospital Medical Officer grade), East Ham Child Guidance Clinic, see North East Metropolitan Regional Hospital Board advertisement in provincial section.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications invited for post of ASSISTANT MORBID ANATOMIST (Senior Hospital Medical Officer). Appointment is full time and non-resident.

Full particulars, with form of application, which must be returned by 15th January, 1951, are obtainable from H. F. RUTHERFORD, House Governor and Secretary.

N.B. The closing date for applications has been altered from previous advertisement in 2nd December issue.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for appointment of Part-time ANÆSTHETIST at above Hospital. Duties will involve a weekly visit to the Hospital and a share of the emergency work, aggregating on an average 5 hours per week. This is a general hospital of about 158 Beds. Applicants should possess a higher qualification and have wide experience in modern methods of anæsthesia. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with names of 3 referees, should reach the Secretary North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 16th December, 1950. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Secretary of the Hospital.

WHITTINGTON HOSPITAL, Highgate, N.19. North West METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for appointment of PHYSICIAN to organise and conduct a Unit of Geriatrics at above Hospital. The work will include the charge of about 150 Beds with outpatient duties and home visiting. This Hospital consists of 3 contiguous hospitals which are being developed as one unit containing approximately 1594 Beds and all the usual Special Departments. It has a large Consultant staff. The Geriatric Unit will probably be housed in the Highgate Wing. Applicants should possess a higher medical qualification and have special interest and experience in the care of the aged. Appointment will be whole-time or for the maximum permitted number of sessions. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post

Applications, stating date of birth, qualifications, and experience, with names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 23rd December, 1950. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Medical Superintendent, St. Mary Wing, Whittington Hospital, Highgate-hill, N.19.

Provincial

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited for following Consultant appointments:—

(*a*) Whole-time or maximum Part-time OBSTETRICIAN AND GYNÆCOLOGIST, South Worcestershire group; duties at hospitals and clinics in Worcester, Evesham, and Malvern areas. Successful candidate expected to reside in or near Worcester.

(*b*) Whole-time or maximum Part-time OBSTETRICIAN AND GYNÆCOLOGIST, Mid-Worcestershire group for duties All Saints' Hospital Bromsgrove, Blakebrook Hospital and Croft Maternity Hospital, Kidderminster, Lucy Baldwin Hospital, Stourport-on-Severn.

(*c*) OPHTHALMOLOGIST (3 notional half-days weekly), Herefordshire group; duties mainly Victoria Eye Hospital, Hereford.

Candidates must possess higher qualification and wide experience in specialty. Appointments in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 23rd December, 1950. Applicants for appointments (*a*) and (*b*) should forward 25 copies of applications. Canvassing will disqualify. Candidates may visit group hospitals.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited for appointment of Whole-time ASSISTANT RADIOLOGIST, Birmingham (Dudley Road) group; duties mainly Dudley Road Hospital (950 Beds). Salary scale £1300–£1750. Candidates must possess D.M.R.D. and wide experience in specialty. Appointment in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 23rd December. Canvassing will disqualify. Candidates may visit group hospitals.

BIRMINGHAM REGIONAL HOSPITAL BOARD AND BIRMINGHAM CITY COUNCIL. Applications invited for the following joint whole-time Consultant appointments to Birmingham (Sanatoria) Group and Birmingham City Council.

(*a*) CHEST PHYSICIAN, Yardley Green Hospital, Birmingham.

(*b*) CHEST PHYSICIAN, Romsley Hill Sanatorium, near Birmingham.

(*c*) CHEST PHYSICIAN, West Heath Sanatorium, Birmingham.

All appointments will include attendance at Anti-Tuberculosis Centre, Birmingham ; applicants should possess higher qualification and wide experience in treatment of tuberculosis. Successful applicants will devote 9/11ths of time to hospital and clinic work for Board and 2/11ths of time to prevention and aftercare work for City of Birmingham. Remuneration for local authority work will be determined in the light of agreement to be negotiated, otherwise appointments in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees to Secretary, 10, Augustus-road, Birmingham, 15, before 16th December, 1950. Applicants for more than 1 appointment should forward 10 copies of application for each additional appointment. Canvassing will disqualify. Candidates may visit sanatoria concerned.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT PATHOLOGIST (whole-time) for hospitals in the Peterborough area. The central laboratory is at the Peterborough Memorial Hospital, but duties will entail work at other hospitals in the area. Special experience in hæmatology and serology desirable. Salary and terms and conditions of service of hospital medical and dental staffs will apply.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, with names of 3 referees, should reach undersigned by 18th December, 1950. Canvassing of Board or Committee members will disqualify. Candidates are invited to visit the Hospital by direct arrangement with Dr. G. F. Walker, Physician-Superintendent, Peterborough Memorial Hospital.

K. V. F. MORTON, Secretary.

117, Chesterton-road, Cambridge.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT RADIOTHERAPIST (whole-time or maximum part-time) at the Norfolk and Norwich Hospital (440 Beds). Wide experience in the specialty essential. Salary and terms and conditions of service of hospital medical and dental staffs will apply.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, with names of 3 referees, should reach undersigned by 18th December, 1950. Canvassing of Board or Committee members will disqualify. Candidates are invited to visit the Hospital by direct arrangement with the Hospital Management Committee Secretary, Mr. F. L. Gatfield, at the Norfolk and Norwich Hospital.

K. V. F. MORTON, Secretary.

117, Chesterton-road, Cambridge.

ISLEWORTH. SOUTH MIDDLESEX HOSPITAL (Infectious Diseases), Mogden-lane, ISLEWORTH, MIDDLESEX. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of ASSISTANT PHYSICIAN at the above very modern and well-equipped Hospital of some 144 Beds, including 48 cubicles. Successful candidate will assist the Physician-Superintendent in the clinical work and in undergraduate and postgraduate teaching, and will deputise for him in his absence. Appointment will be whole-time. Applicants should have had wide experience in general medicine and infectious diseases and should hold a higher qualification. Terms and conditions of service for hospital medical and dental staffs will apply to the post and salary will be on scale £1300–£50–£1750.

Applications, stating date of birth, qualifications, and experience, with names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 16th December, 1950. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Physician-Superintendent.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for post of CONSULTANT PÆDIATRICIAN to hospitals in the Oldham and Ashton-under-Lyne areas. The main unit of 50 Beds is at Boundary Park Hospital, Oldham. Appointment may be held on a whole-time or maximum part-time basis. Salary whole-time £1700–£2750 ; part-time pro rata. Candidates must be of high professional standing with wide experience and must possess a higher degree or diploma. National terms and conditions of service will apply, and the post is superannuable. The Consultant will be required to live within reasonable distance of the main hospital.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, with names and addresses of 3 referees, to be received by 15th December, 1950. Canvassing will disqualify.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for post of Whole-time CONSULTANT PSYCHIATRIST AND MEDICAL SUPERINTENDENT of Prestwich Hospital (2880 Beds), near Manchester. Post is at present non-resident and successful candidate will be expected to live near the Hospital. Candidates must be of high professional standing, with wide experience in psychiatry and possess higher degrees or diplomas. Salary £1700–£2750. Post superannuable and national terms and conditions of service applicable.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, with names and addresses of 3 referees, to be received by 28th December, 1950. Canvassing will disqualify.

AMENDED ADVERTISEMENT

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for post of CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST. The main unit is at Macclesfield General Hospital (West Park Branch), 35 Obstetric and 26 Gynæcological Beds, and the specialist appointed will be responsible for the organisation and supervision of the hospital maternity services and small maternity homes and units in East Cheshire and Crewe. Post may be held either on a whole-time or maximum part-time basis. Salary—whole-time £1700–£2750 ; part-time pro rata. National terms and conditions of service applicable and post superannuable. Candidates must be of high professional standing and possess a higher qualification. Successful candidate will be required to live within a reasonable distance of Macclesfield.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, with names and addresses of 3 referees, to be received by 27th December, 1950. Canvassing will disqualify.

RE-ADVERTISEMENT

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for following posts of Consultant Psychiatrists. The Consultants appointed will conduct consultative clinics and be in clinical charge of mental wards at the Hospital Centres. They will also be appointed Visiting Consultant Psychiatrists to one of the large mental hospitals, where they will have full clinical responsibility, subject only to the general administrative supervision and the statutory functions of the Medical Superintendent. Posts may be held on a whole-time or maximum part-time basis and are non-resident. Salary, whole-time £1700–£2750 ; part-time pro rata. National terms and conditions of service applicable and posts are superannuable. Candidates must be of high professional standing with wide experience in psychiatry, and should possess the relevant higher degrees or diplomas. Candidates for more than one post should indicate their preference.

(1) CONSULTANT PSYCHIATRIST, Blackburn and Burnley Hospital Centres and Visiting Consultant at Whittingham Mental Hospital, near Preston (3000 Beds).

(2) CONSULTANT PSYCHIATRIST, Bolton and Bury Hospital Centres and Prestwich Mental Hospital, near Manchester (3000 Beds).

Forms of application can be obtained from the Senior Administrative Medical Officer, 1, North Parade, Parsonage-gardens, Manchester, 3, and should be returned, with names and addresses of 3 referees, to be received by 18th December, 1950. Canvassing will disqualify.

J. GIBBON, Secretary of the Board.

LEEDS REGIONAL HOSPITAL BOARD invite applications for appointment of a Part-time CONSULTANT in Orthopædic Surgery for duties at hospitals within the Goole, Howden and Selby, and Pontefract and Castleford Hospital Management Committee groups. Appointee required to reside in or near Pontefract. Appointment, which will be initially for 7 sessions per week, will be subject to National Health Service (Superannuation) Regulations, 1950, and remuneration will be in accordance with the terms and conditions of service of hospital medical and dental officers for the time being in operation.

Applications, stating age, qualifications, and details of experience, with names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds, 2, by 30th December, 1950. Canvassing of members of the Board or Advisory Appointments Committee will lead to disqualification.

LEEDS REGIONAL HOSPITAL BOARD invites applications from suitably qualified persons for appointment of REGIONAL BLOOD TRANSFUSION OFFICER. Appointment is a whole-time one, of Consultant status, and will be subject to the terms and conditions of service of hospital medical and dental staffs. The provisions of National Health Service (Superannuation) Regulations, 1950, are also applicable. In accordance with declared policy the Regional Blood Transfusion Service will have close associations with the University School of Medicine and the Board will not object to the successful candidate accepting, if offered, an honorary University appointment.

Applications, stating age, qualifications, and details of experience, with names of 3 referees, should be forwarded to the Secretary, 29–31, Eastgate, Leeds, 2, by 6th January, 1951. Canvassing in any form, either directly or indirectly, will disqualify.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for following Consultant and Senior Hospital Medical Officer positions :—

Part-time PSYCHIATRIST (Consultant grade), Chelmsford Child Guidance Clinic, 2 sessions a week.

Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade), Chelmsford Child Guidance Clinic, 2 sessions a week.

Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade), East Ham Child Guidance Clinic, Town Hall Annexe, London-road, E.6, 2 sessions a week.

Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade), Harold Wood Hospital, Gubbins-lane, Harold Wood, Essex, 1 session a week.

Full-time ASSISTANT PSYCHIATRISTS (Senior Hospital Medical Officer grade), 2 positions, Severalls Mental Hospital, Mile End, Colchester, Essex.

The terms and conditions of service for hospital medical staff will apply.

Separate applications, indicating post concerned, and stating private address, date of birth, full details of qualifications, and experience, present appointment(s) (including number of sessions), grade and salary, with names and addresses of 3 referees, should reach C. E. NICOL, Secretary, 11A, Portland-place, London, W.1, by 30th December, 1950. Canvassing disqualifies.

OXFORD REGIONAL HOSPITAL BOARD invite applications from registered medical practitioners for post of ASSISTANT PSYCHIATRIST to St. Crispin Hospital, Duston, near Northampton. The post, which is in accordance with national terms and conditions of service and is superannuable, will be whole-time and on the salary scale £1300–£50–1750, according to age and experience. Applicants must hold the D.P.M. or equivalent qualification.

Applications (9 copies), stating date of birth, qualifications, experience, and names of 3 referees, should reach the Secretary (from whom further details may be obtained), Oxford Regional Hospital Board, 43, Banbury-road, Oxford, by 22nd December, 1950. Canvassing will disqualify, but applicants are invited to visit the Hospital.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications invited from suitably qualified medical practitioners for following appointments :—

(1) Whole-time ASSISTANT PHYSICIAN (infectious diseases) at Ruchill Hospital, Glasgow, with salary at the appropriate point on the Senior Hospital Medical Officer scale.

(2) Whole-time ASSISTANT PHYSICIAN (infectious diseases) at Strathclyde Hospital, Motherwell, with salary at the appropriate point on the Senior Hospital Medical Officer scale.

(3) Whole-time ASSISTANT ANÆSTHETIST at Stobhill Hospital, Glasgow, with salary at the appropriate point on the Senior Hospital Medical Officer scale.

(4) Whole-time ANÆSTHETIST at Falkirk and District Hospitals and other hospitals in the area as required with salary at the appropriate point on the Senior Hospital Medical Officer scale.

(5) Whole-time ASSISTANT PHYSICIAN (tuberculosis) for duties under the Area Supervising Tuberculosis Physician, Glasgow, with salary at the appropriate point in the Senior Hospital Medical Officer scale.

Above appointments will be subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating age, qualifications, and experience, and present appointment, and giving names of 3 referees, should be submitted not later than 30 days after publication of this advertisement to the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2.

SHEFFIELD REGIONAL HOSPITAL BOARD invite applications from registered medical practitioners with a higher qualification in psychiatry for post of Whole-time ASSISTANT PSYCHIATRIST, who will be attached to the Towers Hospital, Leicester. A flat is available in the Hospital, if desired. Salary and conditions of service will be those laid down by the Ministry for Senior Hospital Medical Officers (£1300–£1750 p.a.) ; starting-point according to age. Post will be subject to National Health Service (Superannuation) Regulations, 1950.

Application forms, and further details, may be obtained from the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Completed forms must be received by 16th December, 1950. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct arrangement with the Medical Superintendent (Dr. T. Wishart Davidson).

WELSH REGIONAL HOSPITAL BOARD invite applications for appointment of a Whole-time CONSULTANT RADIOTHERAPIST to serve the Glantawe Hospital Management Committee group. He will be based on Swansea Hospital, but will be an associate member of the staff of the Radiotherap Centre at Cardiff. He will be expected to take part in the Radiotherapeutic Service for South Wales which will involve visits to hospitals in the area. Candidates must be in possession of a diploma in medical radiology and preferably hold a higher qualification.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify, but this does not preclude candidates from visiting the Hospital.

WELSH REGIONAL HOSPITAL BOARD invite applications from registered medical practitioners for whole-time appointment of an ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade), to serve the Rhymney and Sirhowy Valleys and part of the North Monmouthshire Hospital Management Committee groups, based at Caerphilly Chest Clinic. The candidate should have had a wide experience in chest diseases and tuberculosis in particular, and will work under the direction of the Consultant to the area. Salary in accordance with the terms and conditions of service of hospital medical staff subject to possible adjustment in respect of Local Authority work.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify.

WELSH REGIONAL HOSPITAL BOARD. Applications invited from registered medical practitioners for appointment of a Whole-time CONSULTANT PATHOLOGIST to the Rhymney and Sirhowy Valleys Hospital Management Committee Area. Successful candidate will be based at St. James' Hospital, Tredegar (161 Beds), but will be required to visit other hospitals in the district. Salary in accordance with the terms and conditions of service of hospital medical staff.

Applications, stating date of birth, giving a summary of qualifications, and experience, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify, but this does not preclude candidates from visiting hospitals in the group.

WELSH REGIONAL HOSPITAL BOARD. Applications invited from registered medical practitioners for whole-time appointment of an ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade) to serve the Brecon and Radnorshire area. He will be based in Brecon but will be expected to do clinical duties at Adelina Patti Hospital (130 Beds) under the Glantawe Hospital Management Committee group. The candidate should have had a wide experience in chest diseases and tuberculosis in particular, and will work under the direction of the Consultant to the Area. Salary in accordance with the terms and conditions of service of hospital medical staff subject to possible adjustment in respect of Local Authority work.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify.

WELSH REGIONAL HOSPITAL BOARD. Applications invited from registered medical practitioners for the non-resident post of PHYSICIAN-SUPERINTENDENT (Consultant) to Sully Hospital, near Cardiff (328 Beds for male and female pulmonary tuberculosis). This Hospital is the Thoracic Surgery Centre for South Wales. Applicants should have had a wide experience in tuberculosis and medical administration of hospitals. Successful candidate may be required to take part in the domiciliary service and possession of a higher qualification is desirable. Salary in accordance with the terms and conditions of hospital medical staff.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify.

NORTHERN IRELAND HOSPITALS AUTHORITY invite applications for a post as CONSULTANT PHYSICIAN to the South Antrim group of hospitals, comprising 2 hospitals in Lisburn which have a combined total of 220 Beds. Appointee may also be required to undertake duties in adjacent areas. The terms and conditions of the appointment will be in accordance with the Authority's application of the Spens report to Northern Ireland. The post may be on a whole-time basis or on a part-time basis involving duties remunerated at the rate appropriate to 9 half-days per week. Applicants must be members of a Royal College of Physicians with wide experience in their specialty. Contribution will be payable under the Health Services superannuation scheme. It is the Authority's policy to give preference to persons who have served in wartime in H.M. Forces.

Applications should be made on a form which may be obtained from the Secretary, Northern Ireland Hospitals Authority, Friend's Provident Building, 58, Howard-street, Belfast, which must be returned to him so as to be received not later than 1st January, 1951. Canvassing will disqualify. Any approach to a member of the Authority by or at the request of a candidate for the purpose of obtaining support for his application will be treated as canvassing.

VELLORE, S. INDIA. CHRISTIAN MEDICAL COLLEGE. (480-Bed Hospital, large Outpatient Department, wide variety of material.) Required, RADIOLOGIST for either Diagnostic or Radiation Therapy Departments. Candidates should possess recognised diploma and have had experience.

Communicate with Dr. C. C. CHESTERMAN, O.B.E., 149, Harley-street, London, W.1.

WAIKATO HOSPITAL BOARD. Senior Medical Staff. Applications closing on the 22nd February, 1951, are invited from qualified medical practitioners for the following full-time positions at the Waikato Hospital, Hamilton, New Zealand.

PATHOLOGIST (Senior or Junior Specialist grading).
ORTHOPÆDIC SURGEON (Junior Specialist grading).
ANÆSTHETIST (Junior Specialist or Senior Registrar grading).

Salary, according to qualifications and experience, Senior Specialist grading, minimum £1500, maximum £1750 p.a., annual increments £50, non-resident ; Junior Specialist grading, minimum £1100, maximum £1400 p.a., annual increments £50, non-resident ; Senior Registrar grading, non-resident minimum £881, maximum £981 p.a. annual increments £50, plus cost-of-living bonus 7s. per week, resident minimum £725, maximum £825 p.a., annual increments £50, plus cost-of-living bonus 4s. 9d. per week. Conditions of appointment obtainable from the Office of the High Commissioner for New Zealand, The Strand, London.

Applications, with copies of recent testimonials, stating age, qualifications, and experience, to be addressed to undersigned, to reach him not later than 22nd February, 1951.

A. C. BURGESS, Secretary.
Waikato Hospital Board, Hamilton, New Zealand.

Hospital Services : Junior Appointments

ALBERT DOCK ORTHOPÆDIC AND FRACTURE HOSPITAL, Alnwick-road, E.16. There is an immediate vacancy for a HOUSE SURGEON, and applications are invited from registered British medical practitioners. Salary in accordance with the terms of service for hospital medical staff in the National Health Service—i.e., £450–£500 p.a., according to experience.

Applications, stating age, qualifications, and medical school with dates, and previous experience, with names of not less than 3 recent referees, to be sent as soon as possible to—

F. A. LYON, Secretary of the
Seamen's Hospitals Management Committee.
Dreadnought Hospital, Greenwich, S.E.10.

ANNIE McCALL MATERNITY HOSPITAL, Jeffreys-road, S.W.4. Applications invited from registered Female medical practitioners for resident post of OBSTETRIC HOUSE SURGEON at above Hospital. Appointment for 6 months from 1st January, 1951. Salary £350, £400, or £450 p.a., according to experience, with a deduction at rate of £100 p.a. in respect of board and lodging and other services provided.

Applications, stating age, nationality, and qualifications with dates, with copies of 3 recent testimonials, should be sent to the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11.

CONNAUGHT HOSPITAL, Walthamstow, London, E.17. Required, HOUSE PHYSICIAN, post vacant 16th January, 1951. Salary £350, £400, or £450 p.a., according to experience, with a deduction at rate of £100 p.a. for board, lodging, &c.

Applications, stating age, qualifications, and experience, with names of 2 referees, should be sent not later than 18th December, 1950, to the Secretary, Hospital Management Committee Forest Group (No. 11), Langthorne-road, Leytonstone, E.11.

GUY'S HOSPITAL, S.E.1. Required, Whole-time REGISTRAR to the Department of Psychological Medicine. Duties to commence 1st January, 1951, for 1 year in the first instance. Salary £775 p.a., in accordance with National Health Service terms and conditions of service.

Application forms may be obtained from the Dean, Guy's Hospital Medical School, S.E.1, to whom completed applications, with names of 3 referees, must be forwarded by 12th December, 1950.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. (ROYAL FREE GROUP.) Required, RESIDENT HOUSE PHYSICIAN (Male or Female), post vacant now, tenable for 6 months. Salary in accordance with National Health Service scale.

Applications on the prescribed form, with copies of 3 recent testimonials, to be returned as soon as possible.

KENNETH A. F. MILES, House Governor.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy 15th February, 1951, for a HOUSE SURGEON. Post, which is resident and tenable for 6 months, is graded as that of a Senior House Officer in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), the salary being £670 p.a.

Further particulars and form of application, which must be returned by 5th January, 1951, are obtainable from H. F. RUTHERFORD, House Governor and Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, N.W.8. Applications invited from registered medical practitioners (Male) for appointment of HOUSE SURGEON (first post), vacant Thursday, 1st February, 1951, including practitioners within 3 months of qualification who are liable under the National Health Service Acts. This post is recognised for purposes of F.R.C.S. (Eng.). Appointment for 6 months. Salary at rate of £150 p.a., with full residential emoluments.

Applications should reach the Secretary on or before Saturday, 30th December, 1950, together with copies of 3 recent testimonials.

KING EDWARD MEMORIAL HOSPITAL, Ealing. House OFFICER (second or third post) to Casualty and Fracture Departments, vacant 13th January, 1951. Salary, terms, and conditions as approved for hospital medical staff.

Applications, stating age, nationality, qualifications with dates, and details of experience, with copies of 2 recent testimonials, should be sent to the Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13, by 29th December, 1950.

PADDINGTON HOSPITAL, 285, Harrow-road, W.9. Required, HOUSE SURGEON in the Anæsthetic Department of above Hospital. Salary and conditions in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications, stating age, qualifications, experience, with names and addresses of 2 referees, to be forwarded by 16th December, 1950, to—

C. R. JOLLY, Secretary,
Paddington Group Hospital Management Committee.
285, Harrow-road, W.9.

PRINCE OF WALES'S GENERAL HOSPITAL. (231 Beds.) Required, RESIDENT SENIOR HOUSE SURGEON (third post) for 6 months commencing 9th December, 1950. Salary in accordance with the terms of service issued by the Ministry of Health.

Application form from the Secretary, Tottenham Group Hospital Management Committee (Group 4), The Green, Tottenham, N.15. Closing date 1 week after appearance of this advertisement.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. Required, JUNIOR CASUALTY OFFICER (House Officer, first, second, or third post), Male or Female, non-resident post for 6 months, commencing as soon as possible. Salary and conditions of service in accordance with the terms issued by the Ministry of Health.

Candidates should send their applications, with copies of recent testimonials, immediately to—

M. J. HUNTLEY, Secretary,
West Ham Group Hospital Management Committee.
Stratford, London, E.15.

MILE END HOSPITAL, Bancroft-road, London, E.1. (455 Beds.) Required, HOUSE SURGEON (House Officer, first, second, or third post), vacant 24th December, 1950. Tenable for 6 months. Salary, &c., in accordance with national scale.

Application forms obtainable from the Secretary, Stepney Group Hospital Management Committee, Raine-street, Wapping, E.1.

MOORFIELDS WESTMINSTER AND CENTRAL EYE HOSPITAL (MOORFIELDS BRANCH), City-road, London, E.C.1. Applications invited for post of SIXTH HOUSE SURGEON (Registrar), non-resident. Post subject to the provisions of terms and conditions of service of hospital medical and dental staffs (England and Wales). Appointment for 4 months from 1st March, 1951, and the holder of the post at the completion of that time will be eligible for appointment as Fifth, Fourth, Third, Second, and subsequently as Senior Resident Officer for similar periods, subject to the approval of the Central Medical War Committee.

Applications, with testimonials, stating age, and qualifications, should be submitted on the official form obtainable from undersigned, and be received not later than 22nd December, 1950.

A. J. M. TARRANT, House Governor.

ROYAL FREE HOSPITAL GROUP. Applications invited from either Men or Women medical practitioners for appointment of RESIDENT ANÆSTHETIC REGISTRAR, Senior grade. Applicants must not be more than 10 years qualified and should possess the D.A. qualification. Appointment for 1 year in the first instance, duties to commence 1st January, 1951, or as soon as possible afterwards. Salary and conditions of service in accordance with the terms laid down by the Ministry of Health.

Application forms may be obtained from the House Governor, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned by 18th December, 1950.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. Required, HOUSE SURGEON for duty at above Hospital. Salary and conditions in accordance with terms and conditions of service for hospital medical and dental staffs.

Applications, stating age, qualifications, experience, and names and addresses of 2 referees, to be forwarded by 16th December, 1950, to—

C. R. JOLLY, Secretary,
Paddington Group Hospital Management Committee.
Paddington Hospital, W.9.

ST. GEORGE'S HOSPITAL, S.W.1. Applications invited for post of MEDICAL FIRST ASSISTANT. Successful applicant will be placed in the grade of Registrar or Senior Registrar according to experience and qualifications, and will be required to take up his duties as soon as possible after about the middle of January. Appointment for 1 year in the first instance.

Applications, with names of 2 referees, should be sent by 18th December, 1950, to P. H. CONSTABLE, House Governor.

ST. MARY'S HOSPITAL, London, W.2. Applications invited for post of CLINICAL ASSISTANT (part-time) to the Department for Diseases of the Skin at St. Mary's Hospital for 1 notional half-day per week. This appointment is graded "General Practitioner" and remuneration will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, with names and addresses of 3 referees, should reach undersigned by 23rd December, 1950.

A. POWDITCH, House Governor.

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. (A Hospital of the Fulham and Kensington group.) Required, 2 HOUSE SURGEONS, posts vacant end of year. Appointments are resident and limited to 6 months. Salaries and conditions of service in accordance with national scale.

Applications, stating age, and giving full particulars, with copies of 3 testimonials, should be made to the Secretary (L.125), Fulham and Kensington Hospital Management Committee, St. Mary Abbots Hospital, Marloes-road, Kensington, W.8, by 18th December, 1950.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered Women medical practitioners for appointment of HOUSE PHYSICIAN, vacant 1st February, 1951. Appointment for 6 months. Appointee required to deputise for the Resident Medical Officer. Salary £350, £400, or £450 p.a., according to experience, less a deduction at rate of £100 p.a. for board, residence, &c.

For form of application apply to the Senior Administrative Assistant at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered Women medical practitioners for appointment of RESIDENT MEDICAL OFFICER at the Hospital's 50-Bed country branch near Crawley, Sussex; post vacant 1st February, 1951. Post is of Junior Registrar status and appointment will be for 1 year. Salary £670 p.a., less £150 p.a. for board, residence, &c.

For form of application apply to the Senior Administrative Assistant at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered medical Female practitioners for appointment of GYNÆCOLOGICAL HOUSE SURGEON, vacant 24th January, 1951. Post recognised for the M.R.C.O.G. Appointment for 6 months. Salary £400 or £450 p.a., according to experience, less £100 for full residential emoluments.

For form of application apply to the Senior Administrative Assistant at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered Female medical practitioners for appointment of OBSTETRIC HOUSE SURGEON, vacant 17th January, 1951. Post recognised for the M.R.C.O.G. Appointment for 6 months. Salary £350, £400, or £450 p.a., according to experience, less a deduction of £100 p.a. in respect of board, lodging, &c.

For form of application apply to the Senior Administrative Assistant at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered medical Female practitioners for appointment of HOUSE SURGEON, vacant 17th January, 1951. Appointment for 6 months. Salary £350, £400, or £450 p.a., according to experience, less £100 for full residential emoluments.

For form of application apply to the Senior Administrative Assistant at the Hospital.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered Female medical practitioners for appointment of Part-time ASSISTANT (General Practitioner) in the Ophthalmic Department for 1 notional half-day weekly, post vacant from 18th December, 1950. Salary £175 p.a.

For form of application apply to the Senior Administrative Assistant at the Hospital.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for an appointment as SENIOR REGISTRAR in Thoracic Surgery to a new Thoracic Surgery Unit which is being established at the Brook Hospital, Shootershill, S.E.18, and also to work at Grove Park Tuberculosis Hospital, Marvels-lane, S.E.12. Candidates should have had considerable experience in thoracic surgery, possess a higher qualification in surgery, and satisfy the criteria for such appointments as laid down in the terms and conditions of service of hospital medical and dental staffs (England and Wales). Salary within scale £1000–£1300.

Applications, giving particulars of age, qualifications, and experience, with relevant dates, with names of 3 referees, should be sent to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, by 22nd December, 1950. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but further particulars may be obtained on application.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Required, REGISTRAR in Pathology at Group Pathological Laboratory, St. Mary Abbots Hospital, Marloes-road, Kensington, W.8. Appointment subject to provisions of National Health Service superannuation regulations, and will be in accordance with the agreed terms and conditions of service of hospital medical and dental staffs for the time being in operation. Candidates may visit the Laboratory (by arrangement with the Pathologist), but canvassing in any way will disqualify.

Applications for forms of application (5 copies to be completed) must be accompanied by a stamped addressed foolscap envelope, and made to the Secretary (L.126), Fulham and Kensington Hospital Management Committee, St. Mary Abbots Hospital, Marloes-road, Kensington, W.8, and returned to him by 23rd December, 1950.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for following appointments:—

St. Nicholas Hospital, Plumstead, S.E.18

CASUALTY OFFICER, vacant approximately 16th January.

HOUSE SURGEON, vacant approximately 17th January. Recognised for F.R.C.S.

Brook General Hospital, Shooters Hill-road, S.E.18

HOUSE PHYSICIAN, vacant approximately 9th January.

HOUSE SURGEON (thoracic surgery), vacant January.

British Hospital for Mothers and Babies, Samuel-street, Woolwich.

OBSTETRICAL HOUSE OFFICER, vacant end of January. Recognised for M.R.C.O.G.

Salary £350, £400, or £450 a year, according to experience.

Applications, with copies of 2 recent testimonials, to be sent to Secretary, Memorial Hospital, Woolwich, S.E.18.

Provincial

ASHTON-UNDER-LYNE. LAKE HOSPITAL. (600 Beds.) Required, HOUSE PHYSICIAN for duty at above Hospital and at other hospitals in the Group if required, to commence duty mid-December. Appointment limited to 6 months. Salary £350–£450 p.a., according to experience, less £100 p.a. for board and lodging, &c. R practitioners within 3 months of qualification, also those holding first posts, may apply.

Applications should be addressed to—
R. W. MCVITY, Secretary, Ashton, Hyde, and Glossop Hospital Management Committee.
Astley-road, Stalybridge, Cheshire.

AYLESBURY. ROYAL BUCKINGHAMSHIRE HOSPITAL. (136 Beds.) HOUSE SURGEON (general surgery), second or third post, vacant 9th January, 1951. It is possible that during the 6 months the appointment may be modified to include accident and orthopædic surgery. National terms of service.

Please apply to the Secretary-Superintendent as soon as possible, with 2 testimonials.

BATH. ROYAL NATIONAL HOSPITAL FOR RHEUMATIC DISEASES. Required, HOUSE PHYSICIAN. Salary in accordance with terms and conditions of service laid down by Ministry of Health. Commencing date 1st January, 1951. Hospital is recognised for Part II of D.Phys.Med.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to be received by undersigned as soon as possible.
J. LAWRENCE MEARS, Secretary,
Bath Hospital Management Committee.
Manor Hospital, Bath.

BARNET GENERAL HOSPITAL, Barnet, Herts. Junior REGISTRAR (Casualty Officer) required. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be sent immediately to the Medical Director.

BARNET GENERAL HOSPITAL, Barnet, Herts. House PHYSICIAN (general medicine and pædiatrics), first or subsequent appointment. 6 months' appointment from approximately 1st January, 1951. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, experience, qualifications, with copies of 3 recent testimonials, should be sent immediately to the Medical Director of the Hospital.

BECKENHAM HOSPITAL, Kent. Bromley Group HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required at this busy general hospital of 100 Beds. Appointment for 6 months in the first instance, and the salary will be £350–£450, according to experience, less £100 p.a. for board and lodging and other services provided.

Requests for further information and applications, stating age, qualifications, and details of experience, should be sent to the Administrative Officer, Beckenham Hospital, Croydon-road, Beckenham, Kent.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited for appointment of SENIOR REGISTRAR, Central Mental Hospital, near Warwick (1600 Beds), including Neurosis Unit and clinics for adults and children. Candidates should possess D.P.M. (postgraduate instruction available). Accommodation available. Appointment in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 23rd December. Canvassing will disqualify. Candidates may visit group hospitals.

BIRMINGHAM (SANATORIA) GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER at West Heath Sanatorium, Rednal-road, Birmingham, 31 (210 Beds). Successful applicant will reside at above Sanatorium (accommodation for single person only) and may be required to undertake duties at the Chest Clinic, Great Charles-street, Birmingham, 3. Arrangements will also be made for experience in the Thoracic Surgical Centre of the Group. Salary and conditions of service in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales) and the post is subject to the National Health Service superannuation regulations.

Applications, stating age, qualifications, training and experience, with copies of 3 recent testimonials, should be addressed to the Secretary, Birmingham (Sanatoria) Group Hospital Management Committee, Yardley Green Hospital, Birmingham, 9.

BLACKPOOL. VICTORIA HOSPITAL. Applications invited for post of RESIDENT ANÆSTHETIST, post vacant 1st January, 1951, and is recognised for the D.A. Salary £350, £400, or £450 a year, according to experience, less £100 p.a. for residential emoluments.

Applications, stating age, qualifications, and details of experience, with 3 recent testimonials or names of referees, should be sent to the Administrative Officer, Victoria Hospital, Blackpool. WALTER R. SMITH, Secretary,
Blackpool and Fylde Hospital Management Committee.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON, post vacant 29th December, 1950. Salary in accordance with National Health Service scale £350–£450 p.a., with a deduction of £100 p.a. for full residential emoluments.

Applications, stating age, experience, nationality, and qualifications, with copies of 3 testimonials, to the Assistant Secretary of the above Hospital.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (488 Beds.) Required, CASUALTY OFFICER, post vacant 15th December. Salary in accordance with National Health Service scale £350–£450 p.a., with a deduction of £100 p.a. for full residential emoluments.

Applications, stating age, experience, nationality, and qualifications, with copies of 3 testimonials, to the Assistant Secretary of above Hospital.

BOWDON, CHESHIRE. MANCHESTER THROAT AND CHEST HOSPITAL. (53 Beds.) Required, JUNIOR E.N.T. REGISTRAR (non-resident) to commence as soon as possible. 12 months' appointment. This appointment is in a busy hospital staffed by Manchester consultants and offers excellent opportunities of practical experience to suitably qualified candidates. Salary £670 p.a. Conditions as laid down in accordance with the terms of service issued by the Ministry of Health.

Applications, stating age, qualifications, &c., should be forwarded to the Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

BOWDON, CHESHIRE. MANCHESTER THROAT AND CHEST HOSPITAL. (53 Beds.) Required, HOUSE OFFICER to commence duties as soon as possible. 6 months' appointment. This is a busy hospital staffed by Manchester Consultants. Facilities for postgraduate study will be afforded and there is also opportunity for much practical experience. Salary and conditions as laid down in accordance with the terms of service issued by the Ministry of Health.

Applications, stating age, qualifications, &c., should be forwarded to the Secretary, North and Mid-Cheshire Hospital, Management Committee, The Hospital, Sinderland-road, Altrincham.

BRADFORD. ST. LUKE'S HOSPITAL. House Surgeon (orthopædic and casualty). Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRADFORD. ST. LUKE'S HOSPITAL. House Surgeon (obstetrics and gynæcology). Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRADFORD. CALVERLEY HOSPITAL. House Physician (Male or Female) required for duties at Geriatric Unit at Calverley Hospital and associated hospitals. Salary £350, £400, or £450 p.a., according to experience.

Applications, stating age, qualifications, and experience, with names of 2 referees, should be sent to—

L. R. LORIMER, Secretary,
Bradford B Hospital Management Committee.
Midland Buildings, 12, Canal-road, Bradford.

BRADFORD. NORTHERN VIEW MENTAL HOSPITAL. (96 Female Beds.) Required, Part-time GENERAL PRACTITIONER/MEDICAL OFFICER, for the equivalent of 2 half-days (7 hours) per week. Salary in accordance with para. 10 (*b*) of the terms and conditions of service—£175 p.a. per half-day.

Applications, stating age, qualifications, and experience, with names of 2 referees, should be sent to—

L. R. LORIMER, Secretary,
Bradford B Hospital Management Committee.
Midland Buildings, 12, Canal-road, Bradford.

BRADFORD ROYAL INFIRMARY. House Surgeon required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. Required, HOUSE OFFICER (first, second, or third post). Tenable for 6 months. Duties to include work in general surgical and gynæcological wards. Salary first post £400, second post £450, and third post £500, less a deduction of £100 for board and lodging.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. Required, ORTHOPÆDIC HOUSE OFFICER, first, second, or third post, at above Hospital. Salary first post £400, second post £450, and third post £500, less a deduction of £100 for board and lodging.

Applications, with copies of 3 recent testimonials, should be sent as soon as possible to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester.

BROMSGROVE. ALL SAINTS' HOSPITAL. (468 Beds.) MID-WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. Required :—

HOUSE SURGEON (resident),
HOUSE PHYSICIAN (resident),

at above Hospital. Posts vacant now. Salaries, terms, and conditions approved for hospital medical staff.

Applications, with copies of recent testimonials, to the Physician-Superintendent.

BROMSGROVE. BARNSLEY HALL HOSPITAL. Mid-WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. Required, JUNIOR REGISTRAR. Salary £670 p.a. in accordance with the terms and conditions of service issued by the Ministry of Health. Furnished quarters available at a charge to be fixed.

Applications, stating age, qualifications, and experience, with names of 2 referees, should be forwarded as soon as possible to the Medical Superintendent at above Hospital.

BUCKNALL ISOLATION HOSPITAL. (202 Beds.) Required, HOUSE OFFICER (medical), second or subsequent post. Salary in accordance with national scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including National Service, to undersigned at Princes-road, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

BURTON-ON-TRENT. GENERAL INFIRMARY. (Acute General Hospital—235 Beds.) Required, HOUSE PHYSICIAN (resident). Salary range £350–£450 in accordance with Ministry of Health terms.

Applications, with all details and copies of testimonials, to be forwarded immediately to—

J. E. SMITH, Secretary,
Burton-on-Trent Hospital Management Committee.

BURY GENERAL HOSPITAL, Bury, Lancs. (An Acute General Hospital of 178 Beds mainly surgical with beds for orthopædic and other specialties.) Required, JUNIOR ANÆSTHETIC REGISTRAR (resident or non-resident). Post vacant 31st December, and is recognised for the D.A. Tenure of appointment 1 year. Salary, &c., in accordance with the terms and conditions of service for hospital medical and dental staffs (England and Wales), that is, £670 p.a., non-resident (with a deduction of £100 where the post is resident).

Applications, stating age, nationality, qualifications, and experience, with copies of 2 testimonials, should be forwarded immediately to undersigned, from whom further particulars can be obtained. H. WILKINSON, Secretary,
Bury and Rossendale Hospital Management Committee.

BURY GENERAL HOSPITAL. (164 Beds.) Required, HOUSE SURGEON. Post recognised for the F.R.C.S. Hospital is mainly surgical and experience can be gained in orthopædic and E.N.T. work. Salary and conditions of service in accordance with national scale.

Applications, giving full details of qualifications and experience, should be made immediately to—

H. WILKINSON, Secretary,
Bury and Rossendale Hospital Management Committee.
Bury General Hospital, Bury, Lancs.

CAMBRIDGE. PAPWORTH SANATORIUM. Papworth HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN. Applicants must have held resident surgical and medical posts in a general hospital. Appointment for 6 months and salary is at rate of £400–£450 p.a., according to experience, less £100 for residential emoluments.

Applications should be sent to the Secretary, Papworth Group Hospital Management Committee, Papworth Hall, Cambridge, accompanied by 3 recent testimonials.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, E.N.T. AND EYE HOUSE SURGEON post now vacant at above Hospital. Post is recognised for the D.L.O. and D.O.M.S. examinations. Salary £400 or £450 p.a., according to number of posts held, with a deduction of £100 for residential emoluments.

Applications, giving full particulars of qualifications and experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, ORTHOPÆDIC HOUSE SURGEON. Appointment vacant early in January, 1951, and limited to 6 months. Previous experience in orthopædic surgery an advantage. Post is recognised for the F.R.C.S. Diploma. Salary £400 or £450 p.a., according to number of posts held, with a deduction of £100 p.a. for residential emoluments.

Applications, giving full particulars of qualifications with dates, and experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, SENIOR HOUSE SURGEON (Male), post vacant early in January, 1951. Appointment for 6 months. Appointment is recognised for the F.R.C.S. Diploma, and salary will be £400 or £450 p.a., according to the number of posts held, with a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications with dates, and details of previous experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CATERHAM, SURREY. ST. LAWRENCE'S HOSPITAL. Required, JUNIOR HOSPITAL MEDICAL OFFICER at above Hospital, which accommodates over 2000 mental defectives. Salary £700 p.a., rising to £1000 p.a. If resident, a charge of £165 p.a. is made in respect of board, lodging, &c. The Hospital is situated within easy travelling distance of London, and there are ample opportunities for further study.

Applications, stating full name, age, nationality, qualifications, and experience, and providing names of 2 referees, should be addressed to the Physician-Superintendent, St. Lawrence's Hospital, Caterham, within 10 days of appearance of this advertisement.

CHELMSFORD AND ESSEX HOSPITAL. House Surgeon required to commence beginning January. Salary according to National Health Service scale.

Apply Secretary, Hospital Management Committee, Chelmsford Group, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL, London-road, CHELMSFORD. JUNIOR REGISTRAR (Casualty Officer) required at above Hospital. To commence immediately. Salary according to National Health Service scale.

Apply to Secretary, Hospital Management Committee—Chelmsford Group, London-road, Chelmsford.

CHELMSFORD AND ESSEX AND ST. JOHN'S HOS-PITALS. HOUSE SURGEON required to work at above Hospitals. Salary according to National Health Service scale.

Apply to Secretary, Hospital Management Committee—Chelmsford Group, London-road, Chelmsford.

CHELTENHAM. SUNNYSIDE MATERNITY HOS-PITAL. Required, RESIDENT OBSTETRIC OFFICER, post vacant at the end of December. The Hospital, which is recognised for the purpose of training for the D.Obst.R.C.O.G., has 63 Beds and deals with the majority of abnormal midwifery cases in North Gloucestershire. Appointment for 6 months and the salary will be £400 or £450 p.a., less £100 in respect of residential emoluments.

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be sent to the Secretary, Cheltenham Group Hospital Management Committee, General Hospital, Cheltenham.

CHESTER. COUNTY MENTAL HOSPITAL. Psychiatric SENIOR HOUSE OFFICER required. Salary £670 p.a. Accommodation available for single Man and for which a charge will be made. All forms of modern treatment available including Insulin Unit. There are psychiatric outpatient clinics at 3 General Hospitals, occupational therapy units and voluntary treatment wards. Facilities given to study for higher qualifications.

Apply Medical Superintendent.

COVENTRY GROUP NO. 20 HOSPITAL MANAGE-MENT COMMITTEE. Applications invited for under-mentioned posts. National scale of salary :—

Gulson Hospital, Coventry (329 Beds)
HOUSE PHYSICIAN.

Rugby Hospitals
HOUSE SURGEON (obstetrics and gynæcology), 50 Obstetric, 10 Gynæcological Beds. Duties at the Hospital of St. Cross and St. Mary's Hospital.

Applications, stating age, nationality, qualifications, and experience, with copies of recent testimonials, to the Secretary, Group 20 Hospital Management Committee, Coventry and Warwickshire Hospital, Coventry.

CLACTON AND DISTRICT HOSPITAL, Clacton-on-Sea, Essex. Required, HOUSE SURGEON (first, second, or third post). Appointment for 6 months from 24th January, 1951. Salary in accordance with the terms and conditions of service of hospital medical staff, with a deduction of £100 p.a. in respect of residential emoluments.

Applications, with copies of 2 recent testimonials, should be sent to the Group Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester.

DARTFORD HOSPITAL MANAGEMENT COMMITTEE. RECEIVING ROOM OFFICER (resident), hospital admissions and casualties, vacant 1st January, 1951. Candidates should have held House Officer appointments. Salary £670 a year, less £150 a year for residential emoluments. 6 months' appointment, with possible renewal up to 1 year.

Applications, stating age, qualifications, experience, nationality, and names of 2 persons to whom reference may be made, to the Secretary, Dartford Hospital Management Committee, The Bow Arrow Hospital, Dartford, Kent, by 24th December, 1950.

DAVYHULME. PARK HOSPITAL. Required, Casualty AND ORTHOPÆDIC HOUSE OFFICER, post vacant 29th January, 1951. 6 months' appointment. Salary £350–£450 p.a., according to experience. £100 p.a. deducted for residential accommodation and services. The Hospital is recognised for training for the F.R.C.S. Diploma. Vacancies in the various departments occur periodically at Park Hospital, and Casualty and Orthopædic House Officers are eligible for appointment to the post of House Officer (surgical, medical, and obstetrical) at the end of the term of service as Casualty and Orthopædic House Officer when such vacancies exist.

Application forms, returnable by 14th December, 1950, may be obtained from the Secretary, West Manchester Hospital Management Committee.

DEWSBURY, BATLEY AND MIRFIELD HOSPITAL MANAGEMENT COMMITTEE. Required, JUNIOR HOSPITAL MEDICAL OFFICER in the specialty of pædiatrics. Post is resident and subject to 1 month's notice on either side. Duties to be carried out at hospitals in the Group. Salary according to national scale.

Applications, stating age, qualifications, and nationality, with names of 2 referees, should be forwarded to the Secretary, Dewsbury, Batley and Mirfield Hospital Management Committee, 20, Oxford-road, Dewsbury.

DEWSBURY. THE GENERAL HOSPITAL. House OFFICER (surgical), third or subsequent appointment, to assist Consultant Ophthalmic Surgeon. Recognition of the Hospital as a training centre for the Diploma in Ophthalmology is under consideration. Terms and conditions of service as laid down for hospital medical and dental staffs (England and Wales).

Applications, giving full particulars and names of 3 referees, to undersigned at 20, Oxford-road, Dewsbury.

G. W. BATCHELOR, Secretary,
Hospital Management Committee No. 11,
Dewsbury, Batley and Mirfield Group.

DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Required, NON-RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER in Chest Clinics. Salary and conditions of service in accordance with terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be forwarded by 22nd December, 1950, addressed to the Secretary, Doncaster Hospital Management Committee, c/o Doncaster Royal Infirmary, Doncaster.

DONCASTER ROYAL INFIRMARY. Required, Junior HOSPITAL MEDICAL OFFICER (pathology). Salary commencing at £700 p.a., with annual increments of £50. Post is non-resident. Salary and conditions of service in accordance with terms and conditions of service of hospital medical and dental staffs (England and Wales). Appointment tenable for 3 years in the first instance, subject thereafter to annual renewal.

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be forwarded by 29th December, 1950, to the Secretary, Doncaster Hospital Management Committee, c/o Doncaster Royal Infirmary.

DORCHESTER. DORSET COUNTY HOSPITAL. (125 Beds.) HOUSE SURGEON (Male or Female) required, post vacant mid-December, 1950. Post tenable for 6 months. Appropriate Ministry of Health salary scale according to experience, with a deduction at rate of £100 p.a. for residence.

Applications, giving age, experience, qualifications, and nationality, with copies of testimonials, to be sent to the Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, immediately.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION. Applications invited from registered practitioners for following appointments :—

The Guest Hospital, Dudley (154 Beds)
CASUALTY OFFICER, post now vacant.
RESIDENT ANÆSTHETIST, post now vacant.

Corbett Hospital, Stourbridge (106 Beds)
HOUSE PHYSICIAN, post now vacant.
CASUALTY OFFICER, post now vacant.

Applications, stating age, experience, with copies of 3 recent testimonials, to— H. RAYMOND HURST,
Secretary to the Management Committee.
The Guest Hospital, Dudley.

DARLINGTON MEMORIAL HOSPITAL. Required, RESIDENT ANÆSTHETIST (Male or Female). National Health Service superannuation regulations in force. Previous experience in anæsthesia an advantage, but not essential (trainee post).

Apply, with references and full details, forthwith to—
G. W. BECKWITH, Secretary,
Darlington District Hospital Management Committee.

DARLINGTON MEMORIAL HOSPITAL. (210 Beds.) Required, HOUSE SURGEON (resident). Salary in accordance with national scale.

Apply, giving age and references, forthwith to—
G. W. BECKWITH, Secretary.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry at St. Audry's Mental Hospital, Melton, near Woodbridge, Suffolk (1075 Beds) and associated outpatient clinics in general hospitals in the area. Quarters are available for a single Man, for which a charge will be made. Salary and terms and conditions of service of hospital medical and dental staffs will apply. Appointment for 1 year, renewable for second year.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, with names of 3 referees, should be sent to undersigned not later than 23rd December, 1950. Candidates are invited to visit the Hospital by direct arrangement with Dr. I. Davies, Medical Superintendent.

K. V. F. MORTON, Secretary.
117, Chesterton-road, Cambridge.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ORTHOPÆDIC REGISTRAR at the Peterborough and District Memorial Hospital (175 Beds). Preference given to candidates with a higher surgical qualification. Salary and terms and conditions of service of hospital medical and dental staffs will apply. Appointment for 1 year, renewable for second year.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, with names of 3 referees, should be sent to undersigned not later than 23rd December, 1950. Candidates are invited to visit the hospital by direct arrangement with Mr. Noel Smith, the Orthopædic Surgeon.

K. V. F. MORTON, Secretary.
117, Chesterton-road, Cambridge.

EDGWARE GENERAL (formerly Redhill County) HOSPITAL, EDGWARE, MIDDLESEX. RESIDENT HOUSE SURGEON (genito-urinary and general surgery), post vacant now. 6 months' appointment. Salary £400–£450 p.a., according to experience. Deduction of £100 p.a. for board, lodging, &c.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th December, 1950. Candidates selected for interview will be notified by 23rd December, 1950.

EDGWARE GENERAL (formerly Redhill County) HOSPITAL, EDGWARE, MIDDLESEX. DENTAL HOUSE OFFICER required; post vacant 5th February. Applicants should have registered dental qualifications. 6 months' appointment. Salary £350–£450 p.a., according to experience. Non-resident post. Post approved for the Dental Fellowship (Eng. and Edin.).

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 16th December, 1950. Candidates selected for interview will be notified by 23rd December, 1950.

FARNHAM HOSPITAL, Hale-road, Farnham, Surrey. ASSISTANT SURGICAL OFFICER (first, second, or third post). Salary £350–£450 p.a., according to experience. £100 p.a. deducted in respect of board and lodging, &c. Appointment for 6 months, renewable for further 6 months if applicant is not liable for service with H.M. Forces.

Applications by letter, stating age, qualifications, and experience, and present appointment, with 1–3 recent testimonials (copies), to the Medical Superintendent of the Hospital.

FRODSHAM. LIVERPOOL HOSPITAL, Kingswood, FRODSHAM. (135 Beds.) Required, RESIDENT MEDICAL OFFICER. Salary £750–£50–£1000 p.a., less deduction for residence ; a partly furnished house is available. The Hospital is for the treatment of pulmonary tuberculosis.

Applications, stating age, qualifications, and experience, with names of 2 or 3 referees, should be sent by 11th December, 1950, to Dr. G. S. ERWIN, Physician-Superintendent.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL. Vacancy 1st January, 1951, for RESIDENT MEDICAL OFFICER for the Medical Unit of Great Yarmouth and Gorleston Hospitals. The Unit comprises 30 Beds for acute and chronic medical cases fully equipped to undertake all types of medical treatment and investigations and is under the personal direction of a full-time Consultant. Post provides an excellent opportunity for a practitioner reading for a higher medical qualification. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications, with 3 recent testimonials, should be sent to Secretary-Superintendent, Dene Side, Great Yarmouth, immediately.

GRIMSBY GENERAL HOSPITAL. (220 Beds.) Grimsby HOSPITALS MANAGEMENT COMMITTEE. Required, HOUSE OFFICER (medical), post vacant 6th January, 1951. Salary in accordance with terms and conditions of service issued by the Ministry of Health.

Applications, with names of 2 referees, to be sent to the Administrative Officer, Grimsby General Hospital.

GUILDFORD. ST. LUKE'S HOSPITAL. Guildford GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER at above Hospital for duties in the Radiotherapy Unit (54 Beds). Salary and conditions in accordance with National Health Service scale and terms of appointment.

Applications, giving full details of qualifications, and experience, with copies of 3 recent testimonials, should be forwarded to the Medical Superintendent.

HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON at the Marie Curie Hospital. Salary in accordance with Ministry of Health terms and conditions of service of hospital medical and dental staffs.

Applications, with testimonials, to be sent to the Medical Director, The Marie Curie Hospital, 66, Fitzjohn's-avenue, N.W.3, immediately.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Required, HOUSE SURGEON (Male or Female). Salary according to experience.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, to be addressed to the Secretary at the Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. Required, HOUSE SURGEON (Male) to the Ophthalmic and E.N.T. Departments at this busy acute General Hospital. Post recognised for the D.O. and is vacant early January.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to be forwarded to the Secretary.

HALIFAX. ST. JOHN'S HOSPITAL. Applications invited for appointment of a Female HOUSE PHYSICIAN at above Hospital which at present accommodates 400 aged sick and chronic cases. This Hospital is being developed and is already provided with consultant medical and ancillary services. The House Physician will be responsible to the Medical Registrar —whose main duties are at this Hospital, but who also undertakes duty at the Royal Halifax Infirmary, and to the Visiting Consultants.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 testimonials, to be forwarded to—

R. W. RANSON, Secretary,
Halifax Area Hospitals Management Committee.
Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. Required, HOUSE SURGEON, post now vacant, at above Hospital and for service within the Hastings group of hospitals. Appointment for 6 months. Salary within scale £350–£400–£450 p.a., according to experience and posts held, less a deduction of £100 p.a. for full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications to be sent to the Administrator, Royal East Sussex Hospital, Hastings.

H. A. FROGGATT, Secretary,
Hospital Management Committee (Hastings Group).
11, Holmesdale-gardens, Hastings.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (160 Beds.) Applications invited for following appointments :—

RESIDENT SURGICAL OFFICER (Male). 6 months' appointment. Salary £450 p.a., less £100 p.a. for residential emoluments.

HOUSE SURGEON (Male or Female). 6 months' appointment. Salary £350–£450 p.a., according to previous posts held, less £100 p.a. for residential emoluments.

Applications in writing, stating age, qualifications with dates, and nationality, with copies of 3 testimonials, to be sent immediately, addressed to the undersigned at Pembroke County War Memorial Hospital, Haverfordwest.

A. W. YOUNGS, Secretary,
West Wales Hospital Management Committee.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. HOUSE SURGEON (resident), Male, required for obstetric duties at above Hospital. Previous obstetric experience desirable but not essential. Post tenable for 6 months vacant towards end of December. Salary according to scale £350–£450 p.a., less £100 p.a. for residential emoluments. Whole-time duties under Medical Director.

Applications, not later than 20th December, stating age, nationality, qualifications, and experience, and enclosing copies of 1–3 recent testimonials, to Medical Director.

HINCKLEY AND DISTRICT HOSPITAL, Hinckley, LEICESTERSHIRE. RESIDENT SURGICAL OFFICER required (Junior Hospital Medical Officer grade). Salary and conditions in accordance with national scale for hospital medical staff. 43 Beds, mainly surgical.

Applications, with names of 2 referees, to the Secretary, Leicester No. 2 Hospital Management Committee, 11, Newarke-street, Leicester.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. HOUSE SURGEON required in the E.N.T. Department at the Hull Royal Infirmary and the Victoria Hospital for Sick Children. Recognised for D.L.O. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. ORTHOPÆDIC HOUSE SURGEON required, vacant now. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. HOUSE SURGEON required, vacant now. Recognised for F.R.C.S. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice on either side.

Forms of application from the Administrative Officer.

HORNCHURCH, ESSEX. ST. GEORGE'S HOSPITAL. Required, JUNIOR HOSPITAL MEDICAL OFFICER. This Hospital at present accommodates chronic sick patients and offers excellent geriatric experience. The present beddage is for 268 chronic sick patients which will later be increased. Salary, &c., in accordance with nationally agreed terms and conditions of service for hospital medical and dental staffs.

Applications, stating (in order) age, nationality, qualifications with dates, present and previous appointments, and details of experience, should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, with copies of 2 most recent testimonials or names of 2 referees.

IPSWICH BOROUGH GENERAL HOSPITAL.
MEDICAL REGISTRAR (Junior) required 15th January.
RESIDENT ANÆSTHETIST HOUSE OFFICER required 17th January.
HOUSE PHYSICIAN required 2nd January.
HOUSE SURGEON to General Surgeon required 2nd January. National salary scale.

Applications, with full particulars, to JOHN WILLIAMS, Secretary, Ipswich Group Hospital Management Committee at East Suffolk and Ipswich Hospital, Ipswich.

KETTERING AND DISTRICT GENERAL HOSPITAL. (129 Beds, plus 40-Bed Annexe.) Required, SENIOR HOUSE SURGEON. 4 residents on staff. Salary £350–£450, according to experience, less £100 board-residence. Appointment for 6 months in the first instance, and post is now vacant.

Applications, with copies of 1–3 testimonials, to be sent as soon as possible to—

G. H. FENNELL, Assistant Secretary,
Kettering and District Hospital Management Committee.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) Required, HOUSE SURGEON AND CASUALTY OFFICER to work with a Specialist Orthopædic Unit. Post is full-time, vacant, and normally tenable for 6 months. The terms and conditions of service are those laid down by the Ministry of Health for hospital medical and dental staffs. Salary scale £350–£450 p.a., according to experience.

Applications, stating age, qualifications, experience, and nationality, with names of 2 referees, should be forwarded immediately to the Secretary, Lancaster and Kendal Hospital Management Committee, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) Required, RESIDENT HOUSE OFFICER (anæsthetics) to be attached to a Specialist Anæsthetic Unit, vacant now. Post is full-time and is normally tenable for 6 months. The terms and conditions of service are those laid down by the Ministry of Health for hospital medical and dental staffs. Salary scale £350–£450 p.a., according to experience.

Applications, stating age, qualifications, experience, and nationality, with names of 2 referees, should be forwarded immediately to the Secretary of the Lancaster and Kendal Hospital Management Committee, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) Required, 2 RESIDENT HOUSE SURGEONS to be attached to surgical specialist teams, vacant now. Posts are full-time and are normally tenable for 6 months. The terms and conditions of service are those laid down by the Ministry of Health for hospital medical and dental staffs. Salary scale £350–£450 p.a., according to experience.

Applications, stating age, qualifications, experience, and nationality, with names of 2 referees, should be forwarded immediately to the Secretary of the Lancaster and Kendal Hospital Management Committee, Royal Lancaster Infirmary, Lancaster.

LEEDS. THE UNITED LEEDS HOSPITALS. General INFIRMARY AT LEEDS. Applications invited for HOUSE OFFICER (gynæcology).

Applications, stating age, nationality, qualifications, with names of not more than 2 referees, to be sent to undersigned not less than 10 days after appearance of this advertisement.

S. CLAYTON FRYERS,
Secretary to the Board of Governors.

LEEDS. THE UNITED LEEDS HOSPITALS AND THE UNIVERSITY OF LEEDS. Applications invited for an appointment as SENIOR REGISTRAR AND TUTOR in Orthopædic Surgery (graded Senior Registrar). The vacancy is for 12 months whilst the present holder is absent abroad under the terms of a travelling fellowship, but there is a possibility of renewal. Candidates must have a higher qualification and have a good background of experience in the specialty. They must also possess some ability to teach and be prepared to satisfy the academic requirements of the University of Leeds.

Applications, stating age, nationality, qualifications, experience, and names of 1–3 referees, to be sent to undersigned not later than 10 days after appearance of this advertisement.

S. CLAYTON FRYERS,
Secretary to the Board of Governors.
United Leeds Hospitals.

LINCOLN. THE LAWN HOSPITAL. (For Mental Diseases —100 Beds.) LINCOLN NO. 2 HOSPITAL MANAGEMENT COMMITTEE. Required, JUNIOR HOSPITAL MEDICAL OFFICER. Salary and terms of service as issued by the Ministry of Health. Commencing salary £700 p.a., rising to £1000 p.a. There is a flatlet available. Appointment subject to provisions of National Health Service (Superannuation) Regulations, 1950.

Applications, with names of 3 referees, should be forwarded as soon as possible to the Medical Superintendent, The Lawn Hospital, Lincoln.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Required, HOUSE PHYSICIAN at above Hospital, post vacant 1st January, 1951. Salary £350–£450 p.a., according to experience, less £100 p.a. residential emoluments.

Applications, stating age, qualifications, and experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to— R. W. HOWICK, Secretary,
Lincoln No. 1 Hospital Management Committee.
County Hospital, Lincoln.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Required, HOUSE OFFICER for Orthopædic and Fracture Department, at above Hospital. 6 months' appointment. Salary £350–£450 p.a., less £100 residential emoluments, according to experience.

Applications, stating age, qualifications, and experience, should be forwarded to undersigned, together with copies of 3 recent testimonials. R. W. HOWICK, Secretary,
Lincoln No. 1 Hospital Management Committee.
County Hospital, Lincoln.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Required, HOUSE SURGEON. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 residential emoluments.

Applications, stating age, qualifications, and experience, should be forwarded, with copies of 3 recent testimonials, to—

R. W. HOWICK, Secretary,
Lincoln No. 1 Hospital Management Committee.
County Hospital, Lincoln.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP (No. 14). CASUALTY OFFICER. There are 2 Casualty Officers sharing the duties of the Casualty Department and acting as House Surgeon to Specialist beds. The present vacancy is for an officer to look after E.N.T., dermatology, and V.D. clinics and beds. Post suitable for candidates from the Services and those wishing to gain experience to enter general practice. Tenure of post 6 months. Salary, &c., in accordance with number of posts previously held and the terms and conditions of service of hospital medical and dental staffs.

Apply immediately to Miss V. WELLS, Assistant Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP (NO. 14). Required, RESIDENT HOUSE SURGEON (second or third post), E.N.T. and Ophthalmic Departments, post now vacant. Tenable for 6 months. Salary according to number of previous posts held, and conditions of service in accordance with terms and conditions of service of hospital medical staff.

Applications to be sent as soon as possible to—

Miss V. WELLS, Assistant Secretary.

MANCHESTER, 4. ANCOATS HOSPITAL, Mill-street. Applications invited for following house grade posts :—

2 HOUSE SURGEONS (general).
HOUSE SURGEON to Orthopædic and Fracture Department.
HOUSE SURGEON to E.N.T. Department.
HOUSE PHYSICIAN.

Successful candidates will be required to commence duties on 1st February, 1951.

Applications, stating age, and qualifications, with 2 recent testimonials, should be received by undersigned not later than Monday, 18th December.

JOHN H. DAFFORNE, Genera Superintendent
(Department T.L.).

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for post of E.N.T. REGISTRAR at the Blackburn Royal Infirmary and other hospitals in the group. Salary £775 p.a. National terms and conditions of service applicable. Residential accommodation available at Blackburn Royal Infirmary if required. Appointment for 1 year in the first instance. Candidates must have been qualified at least 2 years and have had previous experience in an E.N.T. Department. A higher qualification is desirable.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, with names and addresses of 3 referees, to be received by 28th December, 1950. Canvassing will disqualify.

MANCHESTER VICTORIA MEMORIAL JEWISH HOSPITAL, Elizabeth-street, MANCHESTER, 8. (Non-Sectarian—105 Beds.) Applications invited for following posts :—

JUNIOR CASUALTY OFFICER AND HOUSE SURGEON, vacant 4th January, 1951.
JUNIOR HOUSE SURGEON, vacant 18th January, 1951.
RESIDENT HOUSE PHYSICIAN, vacant 25th January, 1951.

6 months' appointments. Salaries £350 p.a.—£450 p.a. according to experience, less £100 p.a. emoluments.

Applications, stating qualifications, and experience, with copies of 2 recent testimonials, to be sent to—

M. GRUBER, Hospital Administrator.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS. Applications invited for post of SENIOR HOUSE OFFICER (obstetrical) at the Whitworth Street Branch of the Hospitals. Appointment for 6 months, to commence 1st January, 1951, during which time successful candidate will be required to reside in the Hospital and will discharge the duties of Assistant Resident Obstetric Surgeon. Candidates must have had, in addition to previous obstetrical and gynæcological experience, at least 1 year's postgraduate hospital experience in general medicine and in general surgery. Salary £670 p.a.

Forms of application may be obtained from undersigned and should be returned by 16th December, 1950. The names and addresses of 3 referees are required.

A. R. WISE, General Superintendent.
Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS. Vacancies in the resident medical establishment occur as follows :—

OBSTETRICAL HOUSE SURGEONS, 1st April, 1951, 1st July, 1951, 1st October, 1951, and 1st January, 1952.
GYNÆCOLOGICAL HOUSE SURGEONS, 1st July, 1951, and 1st January, 1952.

Applications are invited for any of these appointments from registered medical practitioners who have already completed 1 year's residence in a general hospital. Previous gynæcological or obstetrical experience is not required. Applications should state whether obstetrical or gynæcological appointments are sought, or whether applicants desire to apply for either type of appointment. Normally the appointments are made 3 months in advance of the date of taking up duty, but candidates are not debarred from forwarding applications up to 1 year in advance of the date for which they wish their applications to be considered. National scale.

Application forms may be obtained from A. R. WISE, General Superintendent, Saint Mary's Hospitals, Whitworth Park, Manchester 13.

MANCHESTER UNITED HOSPITALS. Manchester ROYAL EYE HOSPITAL. Required, HOUSE SURGEON. Salary £350–£450 p.a., according to the number of positions previously held, less £100 p.a. for residential emoluments. Appointment of a practitioner within 3 months of qualification and subject to National Service Acts would be limited to 6 months.

Applications, stating age, details of qualifications, and experience, and nationality, should be forwarded immediately to H. R. NORTH, General Superintendent.

MANSFIELD AND DISTRICT GENERAL HOSPITAL. (250 Beds.) Required, SENIOR HOUSE SURGEON. Duties principally in connection with accident and orthopædic services, but appointee will also be required to act as Deputy to the R.S.O. Salary £400–£450 p.a., less £100 in respect of residential emoluments, in accordance with terms and conditions issued by the Ministry of Health.

Applications, stating age, qualifications, with copies of 2 recent testimonials, to be forwarded immediately to—

A. ASHWORTH, Secretary,
Mansfield Hospital Management Committee.
Oak Bank, Crow Hill-drive, Mansfield, Notts.

NEWPORT, MON. ROYAL GWENT HOSPITAL. (250 Beds.) Required, HOUSE OFFICER (surgical), vacant about Christmas. Appointment is recognised for the Fellowship of the Royal College of Surgeons. Salary £350–£450 p.a. in accordance with number of previous posts held, less a deduction of £100 p.a. for full residential emoluments.

Apply, with names of 2 persons for reference, to—
17, Cardiff-road, Newport, Mon. T. A. JONES, Secretary.

NEWPORT, MON. ST. WOOLOS HOSPITAL. (376 Beds.) Required, HOUSE OFFICERS (medical). There are 2 appointments with different Consultants, 1 vacant 12th December and the other 10th January. Salary £350–£450 p.a. in accordance with number of previous posts held, less £100 for full residential emoluments.

Apply, with names of 2 persons, for reference to—
17, Cardiff-road, Newport. T. A. JONES, Secretary.

NORTHAMPTON GENERAL HOSPITAL. (487 Beds.) Required, E.N.T. SENIOR HOUSE OFFICER, post vacant about the middle of January, 1951. Post recognised for the F.R.C.S. and for the D.L.O. Salary £670 a year, with deduction of £100 p.a. for residential emoluments.

Applications, giving full particulars, and enclosing copies of 3 recent testimonials, should be received by undersigned before or on 21st December, 1950.

S. G. HILL, Secretary, Northampton and
District Hospital Management Committee.

NEWCASTLE. EYE HOSPITAL. Applications invited from registered medical practitioners for post of SENIOR HOUSE OFFICER (resident), vacant 25th January, 1951. The Hospital has 35 Beds, with very busy Outpatient Clinic, and is recognised for the Diploma in Ophthalmology. Previous experience in ophthalmology would be an advantage but not essential. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales) on the scale provided for Junior Registrars.

Applications, with names of 3 referees, should be sent as soon as possible to— K. C. BOOKER, Secretary,
Newcastle upon Tyne Hospital Management Committee.
Newcastle General Hospital, Westgate-road,
Newcastle upon Tyne, 4.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Required, OBSTETRIC REGISTRAR (non-resident) to the Princess Mary Maternity Hospital (90 Beds). Previous experience in midwifery essential. This is the teaching hospital of the University of Durham and is recognised for examination purposes by the Royal College of Obstetricians and Gynæcologists. Salary and conditions of appointment in accordance with the Ministry of Health terms and conditions of service, and appointment effective from 1st January, 1951.

Applications, giving age, nationality, experience, and qualifications, with names and addresses of 3 referees, should be sent to undersigned within 2 weeks of appearance of this advertisement. A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications invited from registered medical practitioners (Male and Female), including R practitioners within 3 months of qualification, for resident appointments vacant 1st February, 1951. Appointments tenable for 6 months and successful applicants will be allocated to one of the following posts :—

HOUSE PHYSICIANS.
HOUSE SURGEONS.
HOUSE PHYSICIANS to Children's Department.
HOUSE SURGEONS to Professorial Surgical Clinic.
HOUSE SURGEONS to Gynæcological Department.
HOUSE SURGEONS to Princess Mary Maternity Hospital.
HOUSE SURGEON to Throat, Nose, and Ear Department.
HOUSE SURGEONS to Orthopædic Department.
HOUSE SURGEON to Skin Department.
HOUSE SURGEONS to Accident Room.
HOUSE SURGEON to Leazes Hospital.
SENIOR ACCIDENT ROOM HOUSE SURGEON AND DEPUTY RESIDENT MEDICAL OFFICER.
HOUSE PHYSICIAN to Bacteriological Department.

Posts of Junior House Surgeon in the Gynæcological Department and Junior House Surgeon in the Princess Mary Maternity Hospital are interchangeable, 3 months in each department. Salary £350–£450 p.a., according to experience. Appointments subject to the terms and conditions of the National Health Service for hospital medical staff.

Applications on the official form should be received by me not later than 18th December, 1950.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Required, SENIOR HOUSE OFFICER to Ophthalmic Department of the Royal Victoria Infirmary. This is the teaching hospital of the University of Durham and successful candidate will have opportunity for clinical experience in inpatient and outpatient work under the direction of the head of the department. He will also be responsible for clinical emergency duty as required. Appointment, which is resident, is for 1 year from 1st February, 1951, and subject to Ministry of Health terms and conditions of service. Salary £670 p.a., less £100 p.a. in respect of emoluments.

Applications, giving age, nationality, experience, and qualifications, with names and addresses of 3 referees, should be sent to undersigned within 2 weeks of appearance of this advertisement. A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE UPON TYNE REGIONAL HOSPITAL BOARD. REGIONAL RADIOTHERAPY SERVICE. Applications invited for posts of REGISTRAR AND SENIOR REGISTRAR in above Service. Appointments will be based at the Newcastle General Hospital and Shotley Bridge Hospital. Salary and conditions of service in accordance with the regulations and appointments will be for 1 year in the first instance.

Applications, giving details of qualifications, and experience, with copies of 1–3 testimonials and/or names and addresses of 1–3 referees, should be sent to the Senior Administrative Medical Officer, Newcastle Regional Hospital Board, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, not later than 23rd December, 1950. Canvassing of members of the Advisory Appointments Committee will disqualify, but candidates are entitled to visit the hospitals by arrangement with the Director, Regional Cancer Bureau, Royal Victoria Infirmary, Newcastle upon Tyne, 1.

NOTTINGHAM GENERAL HOSPITAL. Required, JUNIOR AURAL REGISTRAR (resident), duties to commence immediately. Salary and conditions of service to be in accordance with the published conditions of the National Health Service. The E.N.T. Department has 53 Beds and a large Outpatient Department and is recognised for the D.L.O.

Applications to be addressed to undersigned, stating age, qualifications, and experience, with copies of testimonials.

HENRY M. STANLEY, Secretary,
Nottingham Area No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Ear, Nose, and THROAT DEPARTMENT. Required, AURAL HOUSE SURGEON (first post), Male or Female. Duties to commence as soon as possible. Salary and conditions of service in accordance with the published conditions of the Ministry of Health. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for 6 months.

Applications, stating age, qualifications, and experience, with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,
Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, HOUSE SURGEON (Male or Female) for above Hospital. If held by an R practitioner appointment will be for 6 months. Salary and conditions of service in accordance with the published conditions of the Ministry of Health, less £100 p.a. for emoluments. Duties to commence on or about 2nd January, 1951.

Applications, stating age, qualifications, and experience, with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,
Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, RESIDENT JUNIOR ANÆSTHETIC REGISTRAR (Male or Female). Duties to commence 1st January, 1951. The terms and conditions of service for hospital medical staff will apply.

Applications, stating age, qualifications, and experience, with copies of testimonials, to be sent as soon as possible to—

HENRY M. STANLEY, Secretary,
Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM CHILDREN'S HOSPITAL, Chestnut-grove, NOTTINGHAM. (134 Beds.) Applications invited for following appointments :—

HOUSE SURGEON. HOUSE PHYSICIAN.

Salary in accordance with national scale—i.e., £350, £400, or £450, less £100 for residential emoluments. Hospital is recognised by the Conjoint Board for D.C.H.

Applications, stating age, qualifications, and nationality, with 2 testimonials, to be sent to Administrative Assistant, Children's Hospital, Nottingham.

J. H. HARGREAVES, Secretary,
Nottingham No. 2 Hospital Management Committee.

PENZANCE. WEST CORNWALL HOSPITAL. (General Hospital—100 Beds.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN (Male), post vacant 1st February, 1951. Salary £350 or £400 p.a., from which a deduction at rate of £100 p.a. will be made for board, residence, &c. R practitioners may apply.

Applications, stating age, qualifications with dates, nationality, and present post, with copies of 3 recent testimonials, should be forwarded to—

K. I. NEWELL, Administrative Assistant.
West Cornwall Hospital, Penzance.

PENZANCE. WEST CORNWALL HOSPITAL. (General Hospital—100 Beds.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON (Male), post vacant now. Salary £350 or £400 p.a., from which a deduction at rate of £100 p.a. will be made for board, residence, &c. R practitioners may apply.

Applications, stating age, qualifications with dates, nationality, and present post, with copies of 3 recent testimonials, should be forwarded to K. I. NEWELL, Administrative Assistant.

West Cornwall Hospital, Penzance.

ORMSKIRK. COUNTY HOSPITAL, Wigan-road. (400 Beds.) Applications invited for following appointments, tenable for 6 months :—

HOUSE SURGEON (general surgery).

HOUSE SURGEON with casualty duties.

Both vacant immediately. Salary £350–£450 p.a., according to experience, with a deduction of £100 p.a. for residential emoluments. This is a general hospital providing facilities in several specialties, with a full Consultant Staff. The Hospital is within easy reach of Liverpool and Southport.

Applications, with full details, should be forwarded as soon as possible to— H. E. BECK, Secretary, Ormskirk and District Hospital Management Committee.

County Hospital, Ormskirk, Lancs.

ORMSKIRK. COUNTY HOSPITAL. (400 Beds.) ORMSKIRK AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT ANÆSTHETIST, post vacant immediately. 6 months' appointment. Salary £350–£450 p.a., according to number of posts previously held.

Applications, with full details, and 2 names for reference, should be forwarded immediately to H. E. BECK, Secretary.

County Hospital, Ormskirk, Lancs.

PETERBOROUGH. THE MEMORIAL HOSPITAL. Required, HOUSE PHYSICIAN, post vacant 1st February. Appointment for 6 months.

Applications, with testimonials, should be addressed to the Secretary, Peterborough Area Hospital Management Committee, The Memorial Hospital, Midland-road, Peterborough.

PLYMOUTH. MOUNT GOLD ORTHOPÆDIC HOSPITAL. Required, HOUSE SURGEON at above Hospital (120 Beds). Appointment will be resident and the salary and conditions of service in accordance with the National Health Service terms.

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, should be sent to the Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, as soon as possible.

POOLE GENERAL HOSPITAL. (184 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN (first post), post vacant 29th January, 1951. Salary and conditions of service according to the National Health Service recommendations.

Applications should be sent to the Secretary, Poole General Hospital.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE invite applications for following appointments :—

HOUSE SURGEON, Gosport War Memorial Hospital (General—68 Beds), vacant now.

PÆDIATRIC HOUSE PHYSICIAN, St. Mary's Hospital, vacant 8th January, 1951. There is a Pædiatric Unit of 60 Beds and the post is recognised for candidates preparing for the D.C.H.

HOUSE PHYSICIANS AND HOUSE SURGEONS, St. Mary's Hospital, vacant shortly. General hospital of 1100 Beds including medical, surgical, maternity, geriatric, and mental.

HOUSE SURGEON, Royal Portsmouth Hospital, vacant 27th December, 1950. General acute hospital of 305 Beds.

Salary £350–£450 according to experience, less £100 for residential emoluments.

Applications should give details of age, experience, and qualifications, and names of 2 referees, and be submitted to the Secretary, 18, Landport-terrace, Portsmouth.

PRESTON ROYAL INFIRMARY. (401 Beds.) Required, HOUSE OFFICER (Ophthalmic Department). Recognised for D.O.M.S. National Health Service salaries and conditions.

Applications, stating full particulars, with copy testimonials, should be sent to the Secretary, Preston and Chorley Hospital Management Committee, Royal Infirmary, Preston.

JOHN GIBSON, Secretary.

RAWTENSTALL. ROSSENDALE GENERAL HOSPITAL. There is a vacancy for JUNIOR MEDICAL REGISTRAR (resident) at above Hospital. Salary and conditions of service in accordance with those laid down for hospital medical staff (England and Wales). Hospital is at present in the process of being upgraded and will provide approximately 40 acute medical beds, and in addition there will be responsibility for certain chronic sick wards. Successful applicant required to work under the direction of the Consultant Physician.

Applications, giving full particulars as to qualifications and experience, with copies of recent testimonials, should be made immediately to— H. WILKINSON, Secretary,

Bury and Rossendale Hospital Management Committee.

Bury General Hospital, Bury, Lancs.

READING. ROYAL BERKSHIRE AND BATTLE HOSPITALS. Required, RESIDENT JUNIOR REGISTRAR (Male) to the Accident and Orthopædic Departments of above Hospitals, post vacant 18th December, 1950. Duties will include work in the Casualty Departments. Salary £670, less £100 for board-residence. Appointment subject to terms and conditions of service as published by the Ministry of Health.

Applications, stating age, nationality, qualifications with dates, previous experience, with names of 2 referees, should be sent to the Chief Administrative Officer, Reading and District Hospital Management Committee, 3, Craven-road, Reading, Berks, immediately.

RICHMOND, SURREY. ROYAL HOSPITAL. (121 Beds.) KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGION. RESIDENT HOUSE OFFICER (Physician) required for 6 months commencing 1st January, 1951. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, nationality, qualifications with dates, with copy testimonials, should be forwarded to the Secretary of the Committee, at the Royal Hospital, Richmond, Surrey, by 21st December, 1950.

ROCHFORD. GENERAL HOSPITAL. (572 Beds.) SOUTHEND-ON-SEA HOSPITAL MANAGEMENT COMMITTEE. Required, 3 HOUSE PHYSICIANS. Appointments tenable for 6 months and vacant on 23rd January, 29th January, and 30th January, 1951, respectively. Salary and conditions of service applicable to House Officer grade. Unfurnished quarters may be available for two of these appointments if any of the successful applicants are married.

Applications, stating age, nationality, qualifications with dates, and experience, with copies of 2 recent testimonials, should be forwarded to undersigned at the General Hospital, Rochford, Essex, by 28th December, 1950.

J. C. FIELD, Secretary.

ROCHFORD. GENERAL HOSPITAL. (572 Beds.) SOUTHEND-ON-SEA HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON. Post is now vacant and tenable for 6 months. Salary and conditions of service applicable to House Officer grade.

Applications, stating age, nationality, qualifications with dates, and experience, with copies of 2 recent testimonials, should be forwarded to undersigned at the General Hospital, Rochford, Essex, by 28th December, 1950. J. C. FIELD, Secretary.

RYDE. ROYAL ISLE OF WIGHT COUNTY HOSPITAL. HOUSE PHYSICIAN required at above Hospital (but may be required to serve at any hospital within the group), vacant 19th January, 1951. Salary £350, £400, or £450 p.a., according to experience. National terms of service.

Applications, stating age, qualifications, experience, and nationality, to H. FORSHAW, Chief Administrative Officer, Isle of Wight Group Hospital Management Committee, St. Mary's Hospital, Newport, I.W., as soon as possible.

RYDE, I.W. ROYAL ISLE OF WIGHT COUNTY HOSPITAL. HOUSE SURGEON required for above Hospital (but may be required to serve at any Hospital within the group). Post recognised for F.R.C.S., vacant immediately. Salary £350, £400, or £450 p.a., according to experience. National terms of service.

Applications, stating age, qualifications, experience, and nationality, to H. FORSHAW, Chief Administrative Officer, Isle of Wight Group Hospital Management Committee, St. Mary's Hospital, Newport, I.W., as soon as possible.

SALISBURY GENERAL HOSPITAL (Salisbury Infirmary and Odstock Hospital). (470 Beds.) Required, RESIDENT HOUSE SURGEON to the E.N.T. Department, which consists of 40 Beds together with busy Outpatient and Audiometric Clinics. Appointment now vacant and for 6 months. Salary and conditions of service in accordance with the terms for medical staff in hospitals.

Applications, with copies of 2 recent testimonials, should be sent to the Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, by 16th December, 1950.

SALISBURY, WILTSHIRE. THE OLD MANOR. (A Private Mental Hospital with 672 Beds.) Applications invited for post of ASSISTANT MEDICAL OFFICER. Applicants should not be more than 40 years of age. The commencing salary is £700, and there are good prospects of promotion. A house is available, together with gas, electricity, telephone, and coal. Alternatively bachelor quarters with service, and the post is pensionable.

Letters, enclosing copies of 3 recent testimonials, should be addressed to the Medical Superintendent.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications invited from suitably qualified medical practitioners for following appointments, which will be for 1 year in the first instance :—

(1) SENIOR REGISTRAR in Tuberculosis at Mearnskirk Hospital.

(2) SENIOR REGISTRAR in Tuberculosis for duties under the Area Supervising Tuberculosis Physician, Stirlingshire.

Above appointments will be subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating age, qualifications, and experience, and present appointment, and giving names of 3 referees, should be submitted not later than 30th December, 1950, to the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Required, SENIOR HOUSE PHYSICIAN (Male or Female) at Copthorne Hospital, Shrewsbury, vacant immediately. Salary £450 p.a., less a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications, nationality, and experience, with copy testimonials, should be sent to—

J. P. MALLETT, Secretary,
Shrewsbury Group 15 Hospital Management Committee.
Royal Salop Infirmary, Shrewsbury, 24th October, 1950.

SHREWSBURY. ROYAL SALOP INFIRMARY. (240 Beds.) Required, ORTHOPÆDIC HOUSE SURGEON/CASUALTY OFFICER (Male or Female), vacant immediately. Salary £350–£450 p.a., less a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications, nationality, and experience, accompanied by copy testimonials, should be sent to the Secretary, Group 15 Hospital Management Committee, Royal Salop Infirmary, Shrewsbury.

J. P. MALLETT, Secretary.
Royal Salop Infirmary, Shrewsbury, 23rd September, 1950.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Required, RESIDENT GENERAL HOUSE PHYSICIAN at above Hospital, with certain duties at the Westcliff Hospital, post vacant 1st January, 1951. Salary according to previous house appointments held.

Applications, with particulars of age, qualifications, and previous experience, with copies of recent testimonials, to reach the undersigned by 12th December, 1950.

J. C. FIELD, Secretary.

SHEFFIELD. CITY GENERAL HOSPITAL. (Recognised for F.R.C.S. England.) Required, RESIDENT HOUSE SURGEON (orthopædics), post vacant 1st January, 1951. After 6 months' service candidates will be eligible, if so desired, to obtain resident posts as House Surgeon, House Physician, or House Surgeon (obstetrics and gynæcology).

Forms of application may be obtained from undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary,
Sheffield No. 1 Hospital Management Committee.

SHEFFIELD REGIONAL HOSPITAL BOARD. Radio-THERAPY SERVICE. Applications invited for non-resident posts of SENIOR REGISTRAR AND REGISTRAR at the Sheffield National Centre for Radiotherapy. Candidates must possess the D.R.M.T. Posts offer excellent opportunities for research and great experience would be gained in either post. Appointments for 1 year in the first instance, reviewable annually. Salary and conditions of service in accordance with terms and conditions of service issued by the Ministry of Health.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to reach him by 23rd December, 1950.

SHEFFIELD. UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. Required, HOUSE SURGEON (Male or Female) to the Orthopædic Department, post now vacant. Salary and conditions of service in accordance with the terms laid down by the Ministry of Health for House Officers.

Applications should be sent forthwith to—

FRANK HART, Superintendent.
Royal Infirmary, Sheffield, 6.

SKIPTON GENERAL HOSPITAL, Skipton, Yorkshire, WEST RIDING. (General Hospital of 64 Beds—Visiting Consultant Staff.) Required, HOUSE SURGEON, either sex, post now vacant, 6 months' appointment. Salary £400 or £450 a year, according to experience. National Health Service terms and conditions.

Applications, stating age, qualifications, experience, and nationality, with copies of recent testimonials, to be forwarded as soon as possible, to the Secretary, Bingley, Keighley, Skipton and Settle Hospital Management Committee, St. John's Hospital, Fell-lane, Keighley.

SOUTHAMPTON BOROUGH GENERAL HOSPITAL. HOUSE SURGEON (resident) required immediately. Post tenable for 6 months. Salary £350–£450 p.a., according to previous experience, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by the Ministry of Health.

Applications, with copies of testimonials, to be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON INFECTIOUS DISEASES HOSPITAL AND SANATORIUM. HOUSE OFFICER (Male or Female) required at end of the year. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments. Terms and conditions of service in accordance with those nationally advocated.

Applications, with copies of references, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL. (290 Beds.) HOUSE SURGEON required, resident, vacancy mid-December. Tenable for 6 months. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by Ministry of Health.

Applications, with copies of testimonials, to be submitted immediately to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL. (290 Beds.) Required, ORTHOPÆDIC HOUSE SURGEON (resident), post vacant 31st December, 1950. Tenable for 6 months. This Hospital provides a comprehensive orthopædic service and is the centre to which all trauma from a large industrial town and port is directed. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by the Ministry of Health.

Applications, with copies of testimonials, to be submitted to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

STAMFORD AND RUTLAND HOSPITAL. (105 Beds.) Required, HOUSE OFFICER (surgical). Salary £350–£450 p.a., according to number of posts held, from which a deduction at rate of £100 p.a. made in respect of residential emoluments. Appointment starting immediately for 6 months in the first instance.

Applications, stating age, qualifications, nationality, with copies of recent testimonials, should be forwarded to the Secretary, Stamford and Rutland Hospital, Stamford, Lincolnshire.

SOUTH MIMMS, BARNET, HERTS. CLARE HALL HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited from registered medical practitioners for post of MEDICAL REGISTRAR. The Hospital has 536 Beds including 50 for surgery which includes thoracic conditions. Duties on medical boards. Candidates must have had experience in tuberculosis. Appointment subject to Ministry of Health terms and conditions of service.

Application forms obtainable from, and returnable to, Secretary, Barnet Group Hospital Management Committee, 1, Wellhouse-lane, Barnet, Herts, by not later than 19th December, 1950. Canvassing will disqualify, but candidates may visit the Hospital if they desire to do so.

ST. ALBANS CITY HOSPITAL. Required, Casualty OFFICER (Male). Appointment for 6 months in the first instance. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications should be addressed to the Secretary, Osterhills, Normandy-road, St. Albans.

ST. ALBANS CITY HOSPITAL. Required, House SURGEON (first or second post) for one of the surgical teams, post vacant immediately and tenable for 6 months. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, with names of 2 referees, should be forwarded to the Secretary, Osterhills, Normandy-road, St. Albans.

ST. HELENS HOSPITAL. (183 Beds.) Required, Resident HOUSE PHYSICIAN. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 for residential emoluments.

Applications to be forwarded as soon as possible to—

N. RICHARDS, Secretary, St. Helens and District Hospital Management Committee.

Group Office, County Hospital, Whiston, near Prescot, Lancs.

ST. HELENS HOSPITAL. (183 Beds.) Required, Resident HOUSE SURGEON. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications to be forwarded as soon as possible to—

N. RICHARDS, Secretary, St. Helens and District Hospital Management Committee.

Group Office, County Hospital, Whiston, near Prescot, Lancs.

STAFFORD. ST. GEORGE'S HOSPITAL. Mid Staffs (MENTAL) HOSPITAL MANAGEMENT COMMITTEE. Applications invited for appointment of JUNIOR HOSPITAL MEDICAL OFFICER (resident) at this Hospital (1200 Beds). Salary scale £700–£50–£1000 and conditions of service in accordance with the terms and conditions of service issued by the Ministry of Health. Experience in psychiatry is not essential. Duties will include participation in modern methods of psychiatric treatment including Insulin Shock Therapy.

Applications, stating age, qualifications, and experience, with copies of 3 testimonials, to be sent, not later than 14 days after appearance of this advertisement, to the Medical Superintendent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Required, RESIDENT HOUSE OFFICER (medical), Male or Female, post vacant in the near future. Salary in accordance with national scale for house officers. Appointment for 6 months in the first instance. Applications from recently qualified medical practitioners will be considered.

Applications, giving age, qualifications, and particulars of previous experience, including National Service, if any, with copies of 3 recent testimonials, should be forwarded to the Medical Superintendent, City General Hospital, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary, Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (1000 Beds.) Applications invited for following HOUSE OFFICER posts, Male or Female :—

Surgical (2), posts vacant December.

Surgical (1), post vacant 31st January, 1951.

Posts recognised for F.R.C.S. Salary in each case in accordance with National Health Service scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including National Service, to the Medical Superintendent at the Hospital.

THORNBURROW GIBSON, Secretary, Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (1000 Beds.) Required, HOUSE OFFICER (medical), pædiatrics, Male or Female, post vacant 1st January, 1951. Post recognised for D.C.H. Salary in accordance with national scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including National Service to the Medical Superintendent at the Hospital.

THORNBURROW GIBSON, Secretary, Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. Required, HOUSE OFFICER (surgical), first post, combining main duties at Longton Hospital, Stoke-on-Trent (55 Beds). Salary in accordance with national scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including National Service, to undersigned at Princes-road, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary, Stoke-on-Trent Hospital Management Committee.

SWINDON HOSPITALS. Accident and Orthopædic DEPARTMENTS. Required, RESIDENT HOUSE SURGEONS to above, which are associated with the Wingfield-Morris Orthopædic Hospital, Oxford. Salary in accordance with the approved terms, including the additional £50 p.a.

Applications, giving age, qualifications, and details of service, with names of 1–3 referees, should be sent to the Secretary Swindon and District Hospital Management Committee, Victoria Hospital, Swindon, as soon as possible.

TUNBRIDGE WELLS GROUP HOSPITAL MANAGE-MENT COMMITTEE. DISTRICT HOSPITAL, PEMBURY. Applications invited for post of ORTHOPÆDIC HOUSE SURGEON to begin duties as soon as possible. Post is for 6 months, and previous experience as a House Surgeon is desirable. Work includes long and short stay cases also fractures. Post is recognised for the F.R.C.S. (Eng.) examination. Salary and conditions of service in accordance with the National Health Service scale.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to the Surgeon-Superintendent.

WAKEFIELD A GROUP HOSPITAL MANAGEMENT COMMITTEE NO. 9. Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER in Pædiatrics for service in the Wakefield A group, Wakefield B group, and in the Pontefract and Castleford group. Salary and terms and conditions of service in accordance with the National Health Service Act and Regulations thereunder.

Applications, giving full particulars, with names of 3 referees, should be sent immediately to undersigned at the Clayton Hospital, Wakefield. W. READ, Secretary.

WELWYN GARDEN CITY MATERNITY HOSPITAL. Locum REGISTRAR required immediately for duties mainly at above Hospital for gynæcological and obstetric work for a period of up to 3 months. Salary £775 p.a., in accordance with the terms and conditions of hospital medical and dental staffs (England and Wales).

Applications, giving full particulars as to age, experience, and qualifications, with names of 2 referees, to be forwarded to the Secretary, Mid Herts Group Hospital Management Committee, Osterhills, Normandy-road, St. Albans.

WEST CORNWALL CLINICAL AREA. South-Western REGIONAL HOSPITAL BOARD invite applications from registered medical practitioners for appointment of SURGICAL REGISTRAR, senior or middle grade according to qualifications and experience. Candidates should possess high surgical qualifications, and wide experience in general surgery is essential. Appointment will be held for 1 year and is subject to the terms and conditions of service of hospital medical and dental staffs. Successful applicant will be required to work mainly at the Royal Cornwall Infirmary, Truro, and if appointed to the senior grade will be required to visit hospitals in the clinical area as may be required by the Regional Board from time to time.

Applications (8 copies), stating date of birth, qualifications, and experience, with 8 copies of 2 testimonials, and names and addresses of 2 referees, should be addressed to the Secretary of the Regional Hospital Board, 5, Cotham Lawn-road, Bristol, 6, so as to reach him not later than 30th December, 1950. Canvassing will disqualify.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. RESIDENT ANÆSTHETIST required at above Hospital. Salary £350–£450 p.a., less £100 for emoluments.

Applications, stating age, nationality, qualifications, and previous hospital appointments, with names of 2 referees, should be forwarded as soon as possible to—

T. W. HURST, Secretary, Wigan and Leigh Hospital Management Committee.

Knowsley House, Wigan, 29th November, 1950.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON to the Senior Surgeon, vacant 1st January, 1951. Salary £350, £400, or £450 a year, according to experience, less £100 for board and residence.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WOLVERHAMPTON HOSPITAL MANAGEMENT COM-MITTEE, GROUP NO. 16, BIRMINGHAM REGION. Applications invited from registered medical practitioners for following appointments :—

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

JUNIOR CASUALTY OFFICER, vacant now.

HOUSE SURGEON (Fracture and Orthopædic Department), vacant now.

HOUSE SURGEON (Ear, Throat and Nose Department), vacant 31st December.

REGISTRAR (Fracture and Orthopædic Department), vacant 24th December.

All appointments subject to terms and conditions of service issued by the Ministry of Health.

Applications, with copies of 3 recent testimonials, to be sent to W. COCKBURN, Group Secretary.

The Royal Hospital, Wolverhampton.

WORCESTER ROYAL INFIRMARY. (300 Beds.) Applications invited for following appointments :—

HOUSE SURGEON (general surgery, obstetrics, and gynæcology), now vacant.

HOUSE SURGEON (general surgery), vacant 8th December.

HOUSE SURGEON (E.N.T.), now vacant.

Applications, with full details and copies of testimonials, should be sent to the Secretary, South Worcestershire Hospital Management Committee.

YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for following post :—

Military Hospital, York (Civilian Wing) (52 Beds)

RESIDENT MEDICAL OFFICER. This Hospital is an Annexe to the County Hospital, York. There are at present 14 gynæcological beds, 28 surgical beds, and 10 medical beds. Appointment for 6 months and is vacant immediately. Salary £350 for first post held, £400 for second post held, £450 for third post held, less £100 for residence.

Applications, giving details of age, nationality, qualifications, and experience, with names of 2 referees, to be forwarded immediately to—

F. A. MILNES, F.H.A., A.L.A.A., Secretary, York A and Tadcaster Hospital Management Committee.

Bootham Park, York.

CHANNEL ISLES. JERSEY GENERAL HOSPITAL. (200 Beds.) Applications invited for resident post of SURGICAL REGISTRAR. Post vacant 15th December, 1950, and appointment is for 12 months. Applicants should have had surgical experience and preference given to holders of the F.R.C.S. Salary £650 p.a.

Applications, stating age, nationality, qualifications, and experience, should be sent to the President, Hospital Committee, Jersey General Hospital, St. Helier, Jersey.

WREXHAM. MAELOR GENERAL HOSPITAL. (513 Beds.) Required, HOUSE PHYSICIAN at above Hospital. Appointment for 6 months and will commence immediately. Salary £350–£450 p.a., according to experience, less £100 for full residential accommodation.

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, to be addressed to the Secretary, Wrexham, Powys, and Mawddach Hospital Management Committee, Maelor General Hospital, Croesnewydd-road, Wrexham.

Public Appointments

BIRMINGHAM. CITY OF BIRMINGHAM. PUBLIC HEALTH DEPARTMENT. Applications invited for the temporary appointment of 2 Whole-time MEDICAL OFFICERS (Locums) in the Maternity and Child Welfare Department for a period of 3 months commencing the beginning of January, 1951. Appointments are non-resident, and the salary offered is at rate of £14 per week, or, in the event of any amendment of agreed national scale, the new minimum rate will apply.

Application forms may be obtained from the Medical Officer of Health, Council House, Birmingham, 3, and completed forms should be returned to him, with copies of 3 testimonials, by 13th December, 1950.

BRIGHTON. COUNTY BOROUGH OF BRIGHTON. The Council invite applications for appointment of MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER at a commencing salary of £2000 p.a. The maximum salary will be determined by the Council in due course when an appropriate national scale has been fixed.

Particulars of appointment and form of application may be obtained from me. Applications must be delivered at my office before 12 noon, 15th January, 1951. Canvassing, directly or indirectly, will disqualify. J. G. DREW, Town Clerk.

Town Hall, Brighton, 14th November, 1950.

CIVIL SERVICE COMMISSIONERS invite applications from registered dentists (Men and Women) for permanent appointments as DENTAL OFFICER. There are 11 vacancies on the staff of the Ministry of Health and 2 with the Welsh Board of Health. Inclusive salary scale in London £1100–£35–£1275–£50–£1500 p.a., rather less in Wales and the provinces. The minimum of the scale will be linked to the age of 35 years with deductions of £35 for each year below that age and additions of one increment for each year above that age up to the age of 37 years. Most of the vacancies will be outside London, including the 2 in Wales. Candidates must have had not less than 10 years' experience in the practice of dentistry, either in private practice or in some branch of Public Dental Service. For the posts in Wales a knowledge of the Welsh language is very desirable.

Further particulars and forms of application may be obtained from the Secretary, Civil Service Commission, Burlington-gardens, London, W.1, quoting no. 3397. Completed application forms must reach him by 4th January, 1951.

COLONIAL MEDICAL SERVICE. In the larger Colonies MEDICAL OFFICERS are required for general duties, including hospital and district work. These appointments offer great scope for the practice of many branches of medicine and surgery with a considerable measure of independence and personal responsibility. Appointments can be made on a permanent basis with pension (non-contributory) at age of 50 or 55, or on a temporary basis with gratuity. Secondment from the National Health Service can usually be arranged for periods up to 6 years with continuation of superannuation contributions and the payment of a resettlement grant on reversion to the National Health Service. Salaries range from £860 to £1630 a year, the starting salary depending upon age and experience. In most territories in Africa the scale for newly appointed doctors with an approved higher qualification is £1050–£1600 a year, with a higher point of entry according to experience. There are many specialist and administrative posts with salaries above this scale available for officers in the Service on promotion. Free passages are granted in both directions. Income-tax is very low. Tours of service vary from 10 months in Nigeria to 4 years in Kenya. Houses with heavy furniture are provided in most territories at a rent of about 10% of salary. Annual local leave is available and generous home leave is granted after each tour. Study leave on full pay is available for those who wish to acquire higher qualifications. Social and recreational amenities are good. Officers serving in East and Central Africa usually prefer to educate their children within that area, where schooling is available, or in South Africa. The short tours in West Africa enable frequent visits to be made to children being educated at home. Many officers have their children with them in West Africa until they reach school age.

Application forms can be obtained from the Director of Recruitment (Colonial Service), Colonia. Office, Sanctuary Buildings, Great Smith-street, London, S.W.1. (Ref. no. 27215/14.)

LONDON TRANSPORT EXECUTIVE. Applications invited from registered medical practitioners for a post of ASSISTANT MEDICAL OFFICER. The Executive is developing an industrial medical service for its employees numbering approximately 100,000. Successful applicant will be responsible to the Chief Medical Officer for general clinical work and the medical supervision of working conditions. Commencing salary £1100. Successful candidate required to pass a medical examination and to serve satisfactorily a probationary period, upon completion of which membership of a contributory superannuation fund is compulsory. Applicants must not exceed 45 years of age.

Applications, giving full particulars of qualifications and experience, with names of 3 referees, should be sent within 14 days of appearance of this advertisement to the Staff Officer (reference F/EV. 154), London Transport Executive, 55, Broadway, S.W.1.

DONCASTER. COUNTY BOROUGH OF DONCASTER Applications invited from registered medical practitioners to post of ASSISTANT MEDICAL OFFICER OF HEALTH (Male or Female) at a salary of £735 p.a., by annual increments of £25 to maximum of £935, which will be adjusted in accordance with the terms and conditions of the national scale which are now under review. Preference given to candidates possessing the D.P.H. or D.C.H. Appointee required to carry out, under the direction of the Medical Officer of Health, duties concerned mainly with the School Health and Maternity and Child Welfare Services. Post, which is superannuable under the National Health Service superannuation regulations or Local Government Superannuation Act, 1937, will be terminable by 1 month's notice on either side at any time, and successful candidate required to pass a medical examination.

Applications, giving age, and full particulars of experience and qualifications, with 3 recent testimonials or names and addresses of 3 referees, should be forwarded to the Medical Officer of Health, Wood-street, Doncaster, by 16th December, 1950. H. S. ESSENHIGH, Town Clerk.

Town Clerk's Office, 1, Priory-place, Doncaster.

FACTORY DOCTORS: Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctor under the Factories Acts, 1937 and 1948, are vacant. Applications should be sent to the Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of application*
MELROSE ..	ROXBURGH ..	23RD DECEMBER, 1950
PENKRIDGE ..	STAFFORD ..	23RD DECEMBER, 1950

HERTFORDSHIRE COUNTY COUNCIL. Applications invited from duly registered medical practitioners for appointment as SENIOR ASSISTANT COUNTY MEDICAL OFFICER. Candidates should hold a D.P.H., or equivalent qualification, and should have had practical experience in maternity and child-welfare and school health services. Salary £1100, rising by biennial increments of £50 to maximum of £1300 p.a., with travelling and subsistence allowances on the County scale.

Application forms and particulars can be obtained from the County Medical Officer, County Hall, Hertford, Herts, to whom they should be returned within 14 days of publication of this advertisement.

LANCASHIRE COUNTY COUNCIL. Applications invited for appointment of DEPUTY COUNTY MEDICAL OFFICER OF HEALTH from medical practitioners possessing the D.P.H. or its equivalent. The Deputy County Medical Officer will act under the direct control of the County Medical Officer of Health and will be required to carry out such duties that may be assigned to him. Salary scale £1700, by annual increments of £75 to £2000 p.a., subject to review in the light of any award applicable to the salaries of Medical Officers issued by the National Arbitration Tribunal. Appointment subject to passing a medical examination and is superannuable. It is a condition of appointment that the successful applicant shall reside in or near Preston.

Forms of application are obtainable from the County Medical Officer of Health, County Offices, Preston, to whom they must be returned by 30th December, 1950.

LANCASHIRE COUNTY COUNCIL. Applications invited from registered medical practitioners for appointments of 7 ASSISTANT DIVISIONAL MEDICAL OFFICERS. Possession of D.P.H. desirable. Salary £860–£50–£1060 p.a. Travelling and subsistence allowances where applicable. Posts superannuable and subject to medical examination.

Application forms with full particulars obtainable from County Medical officer of Health, County Offices, Preston.

LEEDS. CITY OF LEEDS. Applications invited for post of ASSISTANT MEDICAL OFFICER OF HEALTH for Mental Health Services from registered medical practitioners. Consolidated salary £1100, rising, subject to satisfactory service, to £1300 p.a. Post is subject to the Superannuation Act and is terminable by 3 months' notice on either side. The candidate will be required to pass a medical examination. Applicants should have had clinical experience in the field of psychiatry and mental deficiency. D.P.M. of a British university will be an additional qualification. Successful candidate, who will work under the direction of the Medical Officer of Health and School Medical Officer, will be responsible for the clinical work of the Mental Health Services, and may be required to carry out such other duties as may be assigned to him.

Applications, on a form to be obtained from undersigned, with names of 3 persons for reference, and endorsed "Assistant Medical Officer of Health," should be sent to the Medical Officer of Health and School Medical Officer, Health Department, 12, Market Buildings, Vicar-lane, Leeds, 1, by 10 A.M., 20th December, 1950. Canvassing in any form, either directly or indirectly, will be a disqualification.

O. A. RADLEY, Town Clerk.

Civic Hall, Leeds, 1, 24th November, 1950.

MIDDLESEX COUNTY COUNCIL. County Health DEPARTMENT. SENIOR ASSISTANT MEDICAL OFFICER (Male) required initially in Area 10 (Twickenham, Feltham, Staines and Sunbury), for administrative duties and certain amount of clinical work. May be required to undertake the duties of Medical Officer of Health or Deputy of one or more County districts in area under arrangements between County Council and Local Authorities, subject to any adjustments of scale according to Ministry of Health regulations, or appropriate award. Established whole time, subject to medical examination and prescribed conditions. Salary £975 p.a., by 3 biennia increments of £50 and 1 of £37 10s. to £1162 10s. p.a., plus any temporary bonus (now £60 p.a.), subject to review when new scales issued.

Applications (no forms), with 2 referees, to the Area Medical Officer, Elmfield House, High-street, Teddington, by 23rd December (quoting H.824.L.). Canvassing disqualifies.

C. W. RADCLIFFE, Clerk of the County Council.

ROTHERHAM. COUNTY BOROUGH OF ROTHERHAM. Health Department. Applications invited from duly qualified medical practitioners (Male or Female) for post of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER at a salary of £735 p.a., rising to £935 by annual increments of £25. Duties will be chiefly in connection with the school health and maternity and child-welfare sections, together with any other duties which may be allocated by the Medical Officer of Health. Appointment is full-time and successful candidate will not be allowed to engage in private practice. Post will be subject to 3 months' notice on either side at any time and to the Council's regulations relating to sick pay and service conditions. Successful candidate will be required to pass a medical examination for superannuation purposes.

Forms of application and conditions of appointment may be obtained from the Medical Officer of Health, Municipal Offices, Rotherham, and must be returned to undersigned, accompanied by copies of 3 testimonials of recent date, endorsed "Assistant Medical Officer" within 14 days of appearance of this advertisement.

JOHN S. WALL, Town Clerk.

Municipal Offices, Rotherham.

ST. HELENS. COUNTY BOROUGH OF ST. HELENS. Applications invited for post of ASSISTANT MEDICAL OFFICER OF HEALTH (Male or Female). Duties mainly in connection with the maternity and child-welfare and school medical services, together with such other duties as the Medical Officer may from time to time direct. Possession of D.P.H. or C.P.H. is desirable but not essential. Salary £735 p.a., by annual increments of £25 to maximum of £935 p.a. Motor-car allowance in accordance with the Council's scale will also be payable. Where a candidate is at present in the service of another Authority on a rising scale, recognition may be given to past service with such Authority in fixing the commencing salary. Appointment subject to provisions of National Health Service superannuation regulations and the Local Government Superannuation Act, 1937. Consideration for housing accommodation will be given according to the circumstances of successful applicant.

Forms of application may be obtained from the Medical Officer of Health, Town Hall, St. Helens and completed applications, with copies of 1–3 recent testimonials, should reach him by 18th December, 1950. Candidates must, when making application, disclose in writing whether to their knowledge they are related to any member of the Council or to a holder of any senior office under the Council. Canvassing members of the Council or Committees of the Corporation will be a disqualification.

FRANK HAUXWELL, Medical Officer of Health.

Town Hall, St. Helens, 25th November, 1950.

YORKSHIRE. NORTH RIDING OF YORKSHIRE COUNTY COUNCIL. Applications invited for whole-time appointment of DEPUTY COUNTY MEDICAL OFFICER OF HEALTH AND DEPUTY SCHOOL MEDICAL OFFICER, from registered medical practitioners holding a degree or diploma in public health. Previous experience in health administration is essential. Appointee required to undertake any duties allotted to him bearing on the health and school services of the County. He will act under the administrative control of and be responsible to the County Medical Officer of Health and County School Medical Officer and will be required to provide a car for which he will be paid on the County Council's scale. Salary £1260, rising by annual increments of £50 to £1360 p.a., appointment superannuable and terminable by 3 calendar months' notice in writing on either side.

Forms of application and further particulars obtainable from County Medical Officer, and returnable to undersigned by 16th December, 1950. Canvassing in any form will be a disqualification.

H. C. THORNLEY, Clerk of the County Council.

County Hall, Northallerton, November, 1950.

Hospital Services : Non-Medical Appointments

SOUTH WARWICKSHIRE HOSPITAL GROUP. PATHOLOGICAL LABORATORY. CENTRAL HOSPITAL, near WARWICK. Applications invited for post of NON-MEDICAL BIOCHEMIST at the South Warwickshire Hospital Group Pathological Laboratory. Applicants should be in possession of either the M.S.C. or F.R.I.C. Salary applicable to the post will be between £700 and £900 p.a., according to experience and subject to adjustment in either direction when the Ministry of Health salary scales for appointments of this nature are promulgated. Post is superannuable and successful candidate will be required to undergo a medical examination upon appointment, if not already employed in the Health Service.

Applications, with names and addresses of 3 referees, should be forwarded to undersigned at 87, Radford-road, Leamington Spa, not later than 27th December, 1950.

W. A. JAMES, Secretary to the Management Committee.

General Practice

For an Executive Council post apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

HINCHLEY WOOD, ESHER. Applications invited for VACANCY in above urban district. List about 1700. Residence and surgery available for purchase. Applications on Form E.C.16A to be posted on or before 21st December, 1950, to—

S. H. BENNETT, Clerk of the Surrey Executive Council.

Building No. 50, Richmond Park Camp,
Kingston Gate, Kingston upon Thames.

WIMBLEDON. Applications invited for a Vacancy (combined practices of a deceased doctor and a doctor retiring from the Service) in Wimbledon. Joint list about 2460. Residence and surgery may be available. Applications on Form E.C.16A to be posted on or before 21st December, 1950, to—

S. H. BENNETT, Clerk of the Surrey Executive Council.

Building No. 50, Richmond Park Camp,
Kingston Gate, Kingston upon Thames.

LEYTON, LONDON, E.11. Applications invited for death VACANCY (urban). List at present approximately 2600. Residence and surgery may be available. Apply on Form E.C.16A before 18th December, 1950, to—

W. A. CHAPMAN, Clerk, Essex Executive Council.

131/3, Fillebrook-road, Leytonstone, E.11.

Miscellaneous

Child Psychiatrist required for the Henderson Trust Home which has been set up for pre-delinquent children under 12 attending ordinary schools. 2 sessions weekly, 1 at the home and 1 in London for treatment of the parents. Remuneration 4 guineas per session.—Applications to the Medical Director, THE NATIONAL ASSOCIATION FOR MENTAL HEALTH, 39, Queen Anne-street, London, W.1.

The Nakuru War Memorial Hospital considers that an opportunity offers for a Radiologist in private practice in Nakuru and district. The above Hospital would be prepared to meet a Radiologist over the cost of equipment for X ray only, excluding treatment.—For further particulars apply : The Superintendent, Box 240, Nakuru, Kenya Colony.

British European Airways invite applications for a senior medical appointment as Regional Medical Officer. Applicants should be between 28 and 40 years of age ; must hold British medical registration, have a knowledge of aviation medicine and the medical supervision of aircrews. Preference will be given to candidates with experience in medical administration, public health, or tropical medicine. Commencing salary £1400 p.a. Successful candidate will be required to join Corporation pension scheme.—Applications, giving full details of education, professional appointments, &c., should be made on an application form obtainable from General Manager (S & S), B.E.A. Head Office, Keyline House, Northolt, Ruislip, Middlesex. The completed form, accompanied by a recent photograph, should be returned not later than 20th December.

Wanted. Trainee Assistant (British), pleasant London suburb. Moderate numbers. Flat will be available.—Address, No. 490, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Young Lady, preliminary S.R.N., orthopædic, dental experience, requires position.—Address, No. 489, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Lady requires position as Receptionist. Well educated, highest references.—Apply Box M.P., c/o BARTLETT'S PUBLICITY SERVICE, 31, Museum-street, London, W.C.1.

Park Square West, 30 yards from Harley-street. Suite of 3 rooms, to Let as Doctor's Consulting-rooms, &c. Rent, inclusive of rates, central heating, cleaning, &c.—Address, No. 479, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wimbledon. To Let. Imposing corner residence with vacant possession of suite of consulting-rooms comprising: Entrance hall, reception offices, surgery, and waiting-room, suitable Doctor or similar profession. Remainder let at £234 p.a. Rent of whole premises only £120 p.a. Lease 8 years. £750 required for lease and fittings.—HAWES & Co., facing Wimbledon Station. WIMbledon 7676–9.

For Sale. Freehold non-basement House, 2 mins. from Highgate tube stn. 5 bedrooms, corner site with garden and garage space, £5000.—Address, No. 487, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Practically unused Portanæst apparatus with self anal- gesia and ether attachments, set of endotracheal tubes and masks, Mackintosh laryngoscope and Magill spray, and set of endotracheal tube connections. £100, sent on approval against cheque or reference.—Address, No. 485, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Large Earthworms, Meal Worms, &c., available through- out the year, 10s. per tin and upwards.—TRING ANGLING SUPPLIES, Research Supplies Department, Tring, Herts.

"Pregnancy Diagnosis by the Xenopus Method." 24-hour service.—Send specimen of urine and £1 1s. fee to : M.O. LABORATORIES LTD., 24, Welbeck-way, London, W.1.

Cambridge Electrocardiograph, Portable Model (1943), in excellent condition. 155 guineas.—Address, No. 488, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141) who are specialists in this kind of work.

Typewriting. Accurate speedy service. Testimonials, theses, notes.—HARRIS, 15, Arkwright Mansions, Finchley-road, N.W.3 (HAMpstead 7949).

Guineapigs, Rabbits of all types for Research. Prompt delivery, keen prices.—GOODCHILD'S, near Crawley, Sussex (Telephone : Poundhill 2167).

New Cars stay new if the upholstery is protected by loose covers.—Write or phone : CAR COVERALL, Department 9, 168, Regent-street, London, W.1 (REGent 7124–5).

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BUFFERED Crystalline Penicillin G, potassium salt, DC(B)L

Crystalline Penicillin G is unstable in solution. The addition of a suitable buffering agent overcomes this disadvantage. Investigation* has shown that the incorporation of 4·5 per cent anhydrous sodium citrate permits the preparation of aqueous solutions of crystalline penicillin G which will retain their activity for considerable periods.

We have pleasure in announcing the availability, through our usual Distributors, of Buffered Crystalline Penicillin G, potassium salt, DC(B)L in the following packs:

200,000 i.u., 500,000 i.u., 1,000,000 i.u.,
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5,000,000 i.u., and 10,000,000 i.u.,
in single containers

selling at the same prices as the unbuffered material.

* Clapham, *Pharm. J.*, 1950, **165**, 126

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Strychnine Glycerophosphate ..	8/200 gr.

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